

# Module Catalog

*M.Sc. Sustainable Resource Management*

TUM School of Life Sciences

Technische Universität München

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## Module Catalog: General Information and Notes to the Reader

### **What is the module catalog?**

One of the central components of the Bologna Process consists in the modularization of university curricula, that is, the transition of universities away from earlier seminar/lecture systems to a modular system in which thematically-related courses are bundled together into blocks, or modules.

This module catalog contains descriptions of all modules offered in the course of study.

Serving the goal of transparency in higher education, it provides students, potential students and other internal and external parties with information on the content of individual modules, the goals of academic qualification targeted in each module, as well as their qualitative and quantitative requirements.

### **Notes to the reader:**

#### **Updated Information**

An updated module catalog reflecting the current status of module contents and requirements is published every semester. The date on which the module catalog was generated in TUMonline is printed in the footer.

#### **Non-binding Information**

Module descriptions serve to increase transparency and improve student orientation with respect to course offerings. They are not legally-binding. Individual modifications of described contents may occur in praxis.

Legally-binding information on all questions concerning the study program and examinations can be found in the subject-specific academic and examination regulations (FPSO) of individual programs, as well as in the general academic and examination regulations of TUM (APSO).

#### **Elective modules**

Please note that generally not all elective modules offered within the study program are listed in the module catalog.

## Index of module handbook descriptions (SPO tree)

Alphabetical index can be found on page 567

### [20201] Sustainable Resource Management | Masterstudium Sustainable Resource Management

<b>Required Modules   Pflichtmodule</b>	14
<b>[WZ1823] Inventory Methods, Statistics and GIS   Inventory Methods, Statistics and GIS</b>	14 - 16
<b>[WZ2713] Methods of Scientific Communication   Methods of Scientific Communication</b>	17 - 18
<b>[WZ1821] Natural Resources - Traits, Management and Theory of Sustainability   Natural Resources - Traits, Management and Theory of Sustainability</b>	19 - 20
<b>[WZ1824] System Analysis and Introduction to Ecology   System Analysis and Introduction to Ecology</b>	21 - 23
<b>Management Aspects   Management Aspects</b>	24
<b>[WI001228] Economics of Environmental and Climate Policy   Economics of Environmental and Climate Policy</b>	24 - 25
<b>[WZ1822] Introduction to Economics and Business Ethics   Introduction to Economics and Business Ethics</b>	26 - 28
<b>[WZ2712] Project Management and Cross Cultural Communication   Project Management and Cross Cultural Communication</b>	29 - 30
<b>[SOT86611] Sustainability Politics and Policy   Sustainability Politics and Policy</b>	31 - 32
<b>[WZ2714] General Education Subject   General Education Subject</b>	33
<b>Languages   Sprachen</b>	33
<b>[SZ0118] Arabic A1.1   Arabisch A1.1</b>	33 - 35
<b>[SZ03031] Intensive Course German as a Foreign Language A2.1   Blockkurs Deutsch als Fremdsprache A2.1</b>	36 - 37
<b>[SZ03041] Intensive Course German as a Foreign Language A2.2   Blockkurs Deutsch als Fremdsprache A2.2</b>	38 - 39
<b>[SZ03061] Intensive Course German as a Foreign Language B1.2   Blockkurs Deutsch als Fremdsprache B1.2</b>	40 - 41
<b>[SZ08011] Intensive Course Portuguese A1   Blockkurs Portugiesisch A1</b>	42
<b>[SZ08061] Intensive Course Portuguese A2.1   Blockkurs Portugiesisch A2.1</b>	43
<b>[SZ0209] Chinese A1.1   Chinesisch A1.1</b>	44 - 45
<b>[SZ0211] Chinese A2.1   Chinesisch A2.1</b>	46 - 47
<b>[SZ0303] German as a Foreign Language A2.1   Deutsch als Fremdsprache A2.1</b>	48 - 49
<b>[SZ0304] German as a Foreign Language A2.2   Deutsch als Fremdsprache A2.2</b>	50 - 51

<b>[SZ0321] German as a Foreign Language A1.1 plus A1.2</b>   Deutsch als Fremdsprache A1.1 plus A1.2	52 - 53
<b>[SZ0322] German as a Foreign Language A2.1 plus A2.2</b>   Deutsch als Fremdsprache A2.1 plus A2.2	54 - 56
<b>[SZ0323] German as a Foreign Language B1.1 plus B1.2</b>   Deutsch als Fremdsprache B1.1 plus B1.2	57 - 59
<b>[SZ0337] German as a Foreign Language A1.1</b>   Deutsch als Fremdsprache A1.1	60 - 61
<b>[SZ0338] German as a Foreign Language A1.2</b>   Deutsch als Fremdsprache A1.2	62 - 63
<b>[SZ0339] German as a Foreign Language B2.1</b>   Deutsch als Fremdsprache B2.1	64 - 65
<b>[SZ0340] German as a Foreign Language B2.2</b>   Deutsch als Fremdsprache B2.2	66 - 67
<b>[SZ0341] German as a Foreign Language C1.1</b>   Deutsch als Fremdsprache C1.1	68 - 69
<b>[SZ0350] German as a Foreign Language B1.1</b>   Deutsch als Fremdsprache B1.1	70 - 71
<b>[SZ0351] German as a Foreign Language B1.2</b>   Deutsch als Fremdsprache B1.2	72 - 74
<b>[SZ0501] French A1.1</b>   Französisch A1.1	75 - 76
<b>[SZ0502] French A1.2</b>   Französisch A1.2	77 - 78
<b>[SZ0503] French A2.1</b>   Französisch A2.1	79 - 81
<b>[SZ0504] French A2.2</b>   Französisch A2.2	82 - 83
<b>[SZ0505] French B1.1</b>   Französisch B1.1	84 - 85
<b>[SZ05061] French B1.2</b>   Französisch B1.2	86 - 87
<b>[SZ0514] French B2 - Communication Course</b>   Französisch B2 - Cours de conversation	88 - 90
<b>[SZ0515] French C1 - Upper Conversation Course</b>   Französisch C1 - Cours de conversation supérieure	91 - 93
<b>[SZ0523] French C1 - French in Business</b>   Französisch C1 - Le français des affaires	94 - 96
<b>[SZ0601] Italian A1.1 + A1.2 - Intensive</b>   Italienisch A1.1 + A1.2 - Intensiv	97 - 98
<b>[SZ0602] Italian A1.1</b>   Italienisch A1.1	99 - 100
<b>[SZ0602] Italian A1.1</b>   Italienisch A1.1	101 - 102
<b>[SZ0605] Italian A1.2</b>   Italienisch A1.2	103 - 104
<b>[SZ06091] Italian B1.2</b>   Italienisch B1.2	105 - 106
<b>[SZ0630] Italian B1/B2 Conversation</b>   Italienisch B1/B2 - Corso di conversazione	107 - 108
<b>[SZ1304] Hebrew A1.1</b>   Hebräisch A1.1	109 - 110
<b>[SZ1305] Hebrew A1.2</b>   Hebräisch A1.2	111 - 112

<b>[SZ0705] Japanese A1.1   Japanisch A1.1</b>	113 - 114
<b>[SZ07052] Japanese A1.1 + A1.2   Japanisch A1.1 + A1.2</b>	115 - 116
<b>[SZ0709] Japanese A1.4   Japanisch A1.4</b>	117 - 118
<b>[SZ1808] Korean A1.1   Koreanisch A1.1</b>	119 - 120
<b>[SZ1601] Dutch A1   Niederländisch A1</b>	121 - 122
<b>[SZ1602] Dutch A2   Niederländisch A2</b>	123 - 124
<b>[SZ1701] Norwegian A1   Norwegisch A1</b>	125 - 126
<b>[SZ1703] Norwegian B1   Norwegisch B1</b>	127 - 128
<b>[SZ0815] Portuguese - Portuguese for Spanish speakers A1 + A2  </b> Portugiesisch - Português para hispanofalantes A1 + A2	129 - 131
<b>[SZ0606] Italian A2.1   Italienisch A2.1</b>	132 - 133
<b>[SZ0801] Portuguese A1   Portugiesisch A1</b>	134 - 136
<b>[SZ0806] Portuguese A2.1   Portugiesisch A2.1</b>	137 - 139
<b>[SZ0808] Portuguese B1.2   Portugiesisch B1.2</b>	140 - 142
<b>[SZ0809] Portuguese B1.1   Portugiesisch B1.1</b>	143 - 145
<b>[SZ1001] Swedish A1   Schwedisch A1</b>	146 - 147
<b>[SZ1002] Swedish A2   Schwedisch A2</b>	148 - 149
<b>[SZ1003] Swedish B1   Schwedisch B1</b>	150 - 151
<b>[SZ1201] Spanish A1   Spanisch A1</b>	152 - 153
<b>[SZ1202] Spanish A2.1   Spanisch A2.1</b>	154 - 156
<b>[SZ1203] Spanish A2.2   Spanisch A2.2</b>	157 - 159
<b>[SZ12031] Spanish A2.1 + A2.2   Spanisch A2.1 + A2.2</b>	160 - 161
<b>[SZ1207] Spanish A1 + A2.1   Spanisch A1 + A2.1</b>	162 - 164
<b>[SZ1209] Spanish C1 - current issues in Spain and Latin America  </b> Spanisch C1 - La actualidad en España y América Latina	165 - 167
<b>[SZ1212] Spanish C1 - Spain and Latin America - Yesterday and Today  </b> Spanisch C1 - España y América Latina ayer y hoy	168 - 169
<b>[SZ1216] Spanish B1.2   Spanisch B1.2</b>	170 - 171
<b>[SZ1217] Spanish B2.2   Spanisch B2.2</b>	172 - 174
<b>[SZ1218] Spanish B1.1   Spanisch B1.1</b>	175 - 176
<b>[SZ1219] Spanish B2.1   Spanisch B2.1</b>	177 - 178
<b>[SZ1225] Spanish B1.1 + B1.2   Spanisch B1.1 + B1.2</b>	179 - 180
<b>[SZ1404] Turkish A1.1   Türkisch A1.1</b>	181 - 182
<b>Generic Competences   Überfachliche Kompetenzen</b>	183
<b>[SG810003] Advanced Statistics   Advanced Statistics</b>	183 - 184
<b>[POL40300] Computational Methods   Computational Methods</b>	185 - 186
<b>[CLA20230] Ethics and Responsibility   Ethik und Verantwortung</b>	187 - 188
<b>[CLA21005] Introduction to Diversity Management   Einführung in Diversity Management</b>	189 - 190
<b>[IN9017] Entrepreneurship   Existenzgründung</b>	191 - 192
<b>[SZ04043] English - English in action - What is Art? from B2   Englisch - English in action - What is Art? ab B2</b>	193 - 194

<b>[SZ0406] English - Writing Academic Research Papers C2</b>   Englisch - Writing Academic Research Papers C2	195 - 196
<b>[SZ0453] English - Scientific Presentation and Writing C2</b>   Englisch - Scientific Presentation and Writing C2	197 - 198
<b>[SZ0454] English - Basic English for Scientific Purposes B2</b>   Englisch - Basic English for Scientific Purposes B2	199 - 200
<b>[SZ0471] English - Intensive Thesis Writers' Workshop C2</b>   Englisch - Intensive Thesis Writers' Workshop C2	201 - 202
<b>[POL65101] Global Health (MSc.)</b>   Global Health (MSc.)	203 - 204
<b>[WI001122] Introduction to Business Law (MiM)</b>   Introduction to Business Law (MiM) [BusLawMiM]	205 - 206
<b>[POL70045] Master Seminar Business Ethics</b>   Masterseminar Wirtschaftsethik	207 - 209
<b>[WZ1550] Mathematics for Economics</b>   Mathematics for Economics	210 - 211
<b>[CIT3640001] Sanitätsausbildung</b>   Sanitätsausbildung	212 - 213
<b>[MCTS9001] Social Studies of Data Science &amp; Engineering</b>   Social Studies of Data Science & Engineering	214 - 216
<b>[SG8000160] Sponsorship-linked Marketing (Online-course)</b>   Sponsorship-linked Marketing (Online-Kurs)	217 - 219
<b>[ED0151] Philosophy of Technology (Advanced Topics)</b>   Technikphilosophie (vertieft)	220 - 221
<b>[MW2245] Think. Make. Start.</b>   Think. Make. Start. [TMS]	222 - 225
<b>Carl von Linde-Akademie</b>   Carl von Linde-Akademie	226
<b>[CLA30267] Communication and Presentation</b>   Kommunikation und Präsentation	226 - 227
<b>[CLA21115] Philosophy of Human-Machine Interaction</b>   Philosophie der Mensch-Maschine-Beziehung	228 - 229
<b>[CLA11123] How to Produce Your Own Videos</b>   Videos selber machen	230 - 231
<b>[CLA10029] Writer's Lab</b>   Writer's Lab	232 - 233
<b>[CLA10412] Technical Writing (Engineer Your Text!)</b>   Technical Writing (Engineer Your Text!)	234 - 235
<b>[CLA10512] Getting More Effective - on My Own and in a Team</b>   Effektiver werden - allein und im Team	236 - 237
<b>[CLA10555] Communication and Facilitation in Project Teams</b>   Communication and Facilitation in Project Teams	238 - 239
<b>[CLA10716] Positions of Modern Design</b>   Positionen des modernen Designs	240 - 241
<b>[CLA10813] Economic Thinking: Economics</b>   Volkswirtschaftlich Denken	242 - 243
<b>[CLA11207] Understanding Art 1: Art Reception infront of Originals in Museums in Munich</b>   Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen	244 - 245

<b>[CLA11301] Presentation Training with Video Feedback  </b> Präsentationstraining vor der Kamera	246 - 247
<b>[CLA11313] Conflict Management and Conducting Discussions  </b> Konfliktmanagement und Gesprächsführung	248 - 249
<b>[CLA11317] Interdisciplinary Lecture Series Environment: Politics and Society  </b> Ringvorlesung Umwelt: Politik und Gesellschaft	250 - 251
<b>[CLA20121] The Sustainability Approach  </b> Leitbild Nachhaltigkeit	252 - 253
<b>[CLA20231] Concepts of Human Being  </b> Mensch und Menschenbilder	254 - 255
<b>[CLA20267] Communication and Presentation  </b> Kommunikation und Präsentation	256 - 257
<b>[CLA20424] Intercultural Encounters  </b> Interkulturelle Begegnungen	258 - 259
<b>[CLA20552] Self-Written, Newly Read - A Literary Writers' Lab  </b> Selbst geschrieben, neu gelesen - Eine literarische Schreibwerkstatt	260 - 261
<b>[CLA20704] Thinking, Perceiving, and Knowing  </b> Denken, Erkennen und Wissen	262 - 263
<b>[CLA20705] Diversity and Conflict Management  </b> Diversität und Konfliktmanagement	264 - 265
<b>[CLA20710] Global Diversity Training  </b> Global Diversity Training	266 - 267
<b>[CLA20910] Gender Competence as Core Qualification  </b> Genderkompetenz als Schlüsselqualifikation	268 - 269
<b>[CLA21005] Introduction to Diversity Management  </b> Einführung in Diversity Management	270 - 271
<b>[CLA21008] Fundamental Principles of Globalisation  </b> Grundlagen der Globalisierungsforschung	272 - 273
<b>[CLA21023] Passing Exams in Relaxed Mode  </b> Entspannt Prüfungen bestehen	274 - 275
<b>[CLA21209] Introduction to Scientific Working  </b> Einführung in das wissenschaftliche Arbeiten	276 - 277
<b>[CLA21411] Stress Competence  </b> Stresskompetenz [EDS-M4]	278 - 279
<b>[CLA30257] Big Band  </b> Big Band	280 - 281
<b>[CLA30258] Jazz Project  </b> Jazzprojekt	282 - 283
<b>[CLA30704] Thinking, Perceiving, and Knowing  </b> Denken, Erkennen und Wissen	284 - 285
<b>[CLA31900] Lecture Series Environment - TUM  </b> Vortragsreihe Umwelt - TUM	286 - 287
<b>[CLA90142] Self-Competence - Intensive Course  </b> Selbstkompetenz - intensiv	288 - 290
<b>[CLA90211] Art and Politics  </b> Kunst und Politik	291 - 292
<b>[WZ0812] Cultural Competence: Choir and Orchestra  </b> Kulturelle Kompetenz: Chor- und Orchester	293 - 294
<b>Elective Courses  </b> Wahlmodule	295
<b>Science Topics  </b> Science Topics	295

<b>Management and Protection of Forest Ecosystems</b>   Management and Protection of Forest Ecosystems	295
<b>[WZ4161] Forest Management</b>   Forest Management	295 - 296
<b>[WZ2716] Forest Growth and Forest Operations</b>   Forest Growth and Forest Operations	297 - 299
<b>[WZ2717] Genetic Resources Management and Forest Protection</b>   Genetic Resources Management and Forest Protection	300 - 302
<b>[WZ4082] Plantation Forestry and Agroforestry</b>   Plantation Forestry and Agroforestry	303 - 305
<b>Wildlife and Protected Area Management</b>   Wildlife and Protected Area Management	306
<b>[WZ4197] Protected Areas Biodiversity and Management</b>   Protected Areas Biodiversity and Management	306 - 307
<b>[WZ4198] Wildlife Management and Wildlife-Human Interactions</b>   Wildlife Management and Wildlife-Human Interactions	308 - 309
<b>[WZ4189] Fisheries and Aquatic Conservation</b>   Fisheries and Aquatic Conservation	310 - 312
<b>[WZ6432] Wildlife and Conservation Biology</b>   Wildlife and Conservation Biology	313 - 314
<b>Landscape Management</b>   Landscape Management	315
<b>[WZ4201] Vegetation Ecology and Geographical Information Systems</b>   Vegetation Ecology and Geographical Information Systems	315 - 316
<b>[WZ2719] Landscape Planning</b>   Landscape Planning	317 - 318
<b>[WZ2737] Remote Sensing and Image Processing</b>   Remote Sensing and Image Processing	319 - 321
<b>[WZ4094] Landscape Management - Application Study</b>   Landscape Management - Application Study	322 - 323
<b>Renewable Resources</b>   Renewable Resources	324
<b>[WIB14002] Advanced Seminar Life Sciences, Management &amp; Policy: Sustainable Entrepreneurship - Theoretical Foundations</b>   Advanced Seminar Life Sciences, Management & Policy: Sustainable Entrepreneurship - Theoretical Foundations	324 - 326
<b>[WZ2720] Renewable Energy Technologies</b>   Renewable Energy Technologies	327 - 328
<b>[WZ2721] Agriculture Raw Materials and their Utilization</b>   Agriculture Raw Materials and their Utilization [ARM&U]	329 - 330
<b>[WZ4098] Forestry Raw Materials and their Utilization</b>   Forestry Raw Materials and their Utilization	331 - 332
<b>[WZ4202] Political and Social Perspectives of Renewable Resources</b>   Political and Social Perspectives of Renewable Resources	333 - 334
<b>[EI70860] Integration of Renewable Energies</b>   Integration of Renewable Energies [IRE]	335 - 336



<b>Climate, Air and Water</b>   Climate, Air and Water	337
<b>[WZ2731] Hydrometeorology and Management of Water Resources</b>   Hydrometeorology and Management of Water Resources	337 - 338
<b>[WZ2722] Mountain Catchments under Changing Climate</b>   Mountain Catchments under Changing Climate	339 - 340
<b>[WZ2732] Environmental Monitoring and Data Analysis</b>   Environmental Monitoring and Data Analysis	341 - 342
<b>[WZ2730] Climate Change - Science, Impacts and Adaptation, Mitigation</b>   Climate Change - Science, Impacts and Adaptation, Mitigation	343 - 344
Soils and Soil Management	345
<b>[WZ2733] Introduction to Soil Science</b>   Introduction to Soil Science	345 - 346
<b>[WZ2734] Soil Protection</b>   Soil Protection	347 - 348
<b>[WZ2735] World Soil Resources</b>   World Soil Resources	349 - 350
<b>[WZ2736] Analytical Characterization of Soil Resources</b>   Analytical Characterization of Soil Resources	351 - 352
<b>Material and Waste Management</b>   Material and Waste Management	353
<b>[WZ2724] Emission Control in Land-Use and Animal Husbandry</b>   Emission Control in Land-Use and Animal Husbandry	353 - 354
<b>[WZ4206] Material Flow Management and Applications</b>   Material Flow Management and Applications	355 - 356
<b>[ED160017] Sustainable Manufacturing</b>   Nachhaltige Produktion [SuM]	357 - 359
<b>[WZ2723] Utilization and Treatment of Special Materials and Waste</b>   Utilization and Treatment of Special Materials and Waste	360 - 361
<b>[BGU38014] Water and Wastewater Treatment Engineering</b>   Wasserversorgung, Wasseraufbereitung und Abwasserbehandlung	362 - 364
<b>[WZ4207] Waste and Waste Water Treatment</b>   Waste and Waste Water Treatment	365 - 367
<b>Sustainable Agricultural Value Chains</b>   Sustainable Agricultural Value Chains	368
<b>[WZ1876] Entrepreneurship in the Agricultural and Horticultural Industry</b>   Entrepreneurship in the Agricultural and Horticultural Industry	368 - 370
<b>[WZ1921] Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry</b>   Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry	371 - 373
<b>[WZ1567] Sustainability: Paradigms, Indicators, and Measurement Systems</b>   Sustainability: Paradigms, Indicators, and Measurement Systems	374 - 376
<b>[WI001190] Cooperation and Integration in Agribusiness</b>   Cooperation and Integration in Agribusiness	377 - 379

<b>[WI001215] Network and stakeholder analysis: Sustainable resource use and agri-food system</b>   Network and stakeholder analysis: Sustainable resource use and agri-food system	380 - 382
<b>Free Elective Modules</b>   Free Elective Modules	383
<b>[BGU38019] Anaerobic Processes and Energy Recovery</b>   Anaerobtechnik und Energierückgewinnung	383 - 384
<b>[CS0126] Advanced Seminar in Circular Economy and Sustainability Management</b>   Advanced Seminar in Circular Economy and Sustainability Management [ASCESM]	385 - 386
<b>[WZ0246] Advanced Concepts and Methods in Urban Ecosystems</b>   Advanced Concepts and Methods in Urban Ecosystems	387 - 390
<b>[WZ2721] Agriculture Raw Materials and their Utilization</b>   Agriculture Raw Materials and their Utilization [ARM&U]	391 - 392
<b>[WZ2736] Analytical Characterization of Soil Resources</b>   Analytical Characterization of Soil Resources	393 - 394
<b>[WZ2757] Advanced Environmental and Natural Resource Economics</b>   Advanced Environmental and Natural Resource Economics	395 - 396
<b>[WI001190] Cooperation and Integration in Agribusiness</b>   Cooperation and Integration in Agribusiness	397 - 399
<b>[WZ1590] Climate Change Economics</b>   Climate Change Economics	400 - 402
<b>[WZ2730] Climate Change - Science, Impacts and Adaptation, Mitigation</b>   Climate Change - Science, Impacts and Adaptation, Mitigation	403 - 404
<b>[LS20022] Experimental Methods in Soil and Plant Hydrology</b>   Experimental Methods in Soil and Plant Hydrology	405 - 406
<b>[POL62200] Energy Transformation</b>   Energy Transformation	407 - 409
<b>[SOT86700] EuroTeQ Collider - Leave no Waste Behind (Master)</b>   EuroTeQ Collider - Leave no Waste Behind (Master)	410 - 412
<b>[WI000286] Environmental and Natural Resource Economics</b>   Environmental and Natural Resource Economics	413 - 414
<b>[WI001204] Economics of Water Use, Regulation and Markets</b>   Economics of Water Use, Regulation and Markets	415 - 417
<b>[WZ0228] Exercises in Precision Agriculture and Plant Phenotyping</b>   Exercises in Precision Agriculture and Plant Phenotyping	418 - 419
<b>[WZ1876] Entrepreneurship in the Agricultural and Horticultural Industry</b>   Entrepreneurship in der Agrar- und Gartenbauwirtschaft	420 - 422
<b>[WZ2724] Emission Control in Land-Use and Animal Husbandry</b>   Emission Control in Land-Use and Animal Husbandry	423 - 424
<b>[WZ2732] Environmental Monitoring and Data Analysis</b>   Environmental Monitoring and Data Analysis	425 - 426
<b>[BGU62039] Case Studies of Sustainable Urban Developments and Infrastructure</b>   Fallstudien nachhaltiger Quartiers-, Stadt- und Infrastrukturentwicklungen [FNQSI]	427 - 430

<b>[WZ2716] Forest Growth and Forest Operations</b>   Forest Growth and Forest Operations	431 - 433
<b>[WZ4098] Forestry Raw Materials and their Utilization</b>   Forestry Raw Materials and their Utilization	434 - 435
<b>[WZ4161] Forest Management</b>   Forest Management	436 - 437
<b>[WZ4189] Fisheries and Aquatic Conservation</b>   Fisheries and Aquatic Conservation	438 - 440
<b>[IN2124] Basic Mathematical Methods for Imaging and Visualization</b>   Basic Mathematical Methods for Imaging and Visualization	441 - 443
<b>[WZ2717] Genetic Resources Management and Forest Protection</b>   Genetic Resources Management and Forest Protection	444 - 446
<b>[WZ1545] Human Resource Management in Agriculture and Related Industries</b>   Human Resource Management in Agriculture and Related Industries	447 - 448
<b>[WZ2731] Hydrometeorology and Management of Water Resources</b>   Hydrometeorology and Management of Water Resources	449 - 450
<b>[EI70860] Integration of Renewable Energies</b>   Integration of Renewable Energies [IRE]	451 - 452
<b>[EI7467] Interdisciplinary Project Internship Concept Development of a Renewable Energy System in a Developing Country</b>   Interdisciplinary Project Internship Concept Development of a Renewable Energy System in a Developing Country [ProRESDC]	453 - 455
<b>[LS50000] International Climate Strategies / UNFCCC</b>   International Climate Strategies / UNFCCC	456 - 458
<b>[WZ2733] Introduction to Soil Science</b>   Introduction to Soil Science	459 - 460
<b>[WZ4094] Landscape Management - Application Study</b>   Landscape Management - Application Study	461 - 462
<b>[LS10013] Modelling and Statistical Analysis of Large Arrays</b>   Modelling and Statistical Analysis of Large Arrays [MASALA]	463 - 465
<b>[WZ2722] Mountain Catchments under Changing Climate</b>   Mountain Catchments under Changing Climate	466 - 467
<b>[WZ4206] Material Flow Management and Applications</b>   Material Flow Management and Applications	468 - 469
<b>[BGU38023] Engineered Natural Treatment Systems</b>   Natürliche Aufbereitungsverfahren	470 - 471
<b>[ED160017] Sustainable Manufacturing</b>   Nachhaltige Produktion [SuM]	472 - 474
<b>[WI001215] Network and stakeholder analysis: Sustainable resource use and agri-food system</b>   Network and stakeholder analysis: Sustainable resource use and agri-food system	475 - 477
<b>[WZ2719] Landscape Planning</b>   Landscape Planning	478 - 479
<b>[EI74831] Project Lab Renewable and Sustainable Energy Systems</b>   Project Lab Renewable and Sustainable Energy Systems [PropENS]	480 - 482

<b>[WI001205] People in Organizations: Managing Change and Sustainability in Agribusiness and the Food Industry</b>   People in Organizations: Managing Change and Sustainability in Agribusiness and the Food Industry	483 - 485
<b>[WZ4082] Plantation Forestry and Agroforestry</b>   Plantation Forestry and Agroforestry	486 - 488
<b>[WZ4197] Protected Areas Biodiversity and Management</b>   Protected Areas Biodiversity and Management	489 - 490
<b>[WZ4202] Political and Social Perspectives of Renewable Resources</b>   Political and Social Perspectives of Renewable Resources	491 - 492
<b>[LS10003] Remote Sensing of Agriculture and Vegetation</b>   Remote Sensing of Agriculture and Vegetation	493 - 494
<b>[LS10004] Research Project 'Smart Agriculture'</b>   Research Project 'Smart Agriculture'	495 - 497
<b>[LS10007] Remediation of Contaminated Sites – Lecture and Seminar</b>   Remediation of Contaminated Sites – Lecture and Seminar	498 - 499
<b>[LS20016] Rhizosphere Research</b>   Rhizosphere Research	500 - 502
<b>[WI001255] Lecture Series Renewable Energy Systems in the Global South</b>   Ringvorlesung Erneuerbare Energiesysteme im Globalen Süden	503 - 505
<b>[WZ1674] Research Methods and Economic Research Project</b>   Research Methods and Economic Research Project	506 - 508
<b>[WZ2720] Renewable Energy Technologies</b>   Renewable Energy Technologies	509 - 510
<b>[WZ2737] Remote Sensing and Image Processing</b>   Remote Sensing and Image Processing	511 - 513
<b>[LS20023] Soil and Plant Hydrology</b>   Soil and Plant Hydrology	514 - 515
<b>[WI001165] Sustainable Entrepreneurship - Getting Started</b>   Sustainable Entrepreneurship - Getting Started	516 - 518
<b>[WZ1567] Sustainability: Paradigms, Indicators, and Measurement Systems</b>   Sustainability: Paradigms, Indicators, and Measurement Systems	519 - 521
<b>[WZ1921] Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry</b>   Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry	522 - 524
<b>[WZ2734] Soil Protection</b>   Soil Protection	525 - 526
<b>[BGU70005] Transportation Economics</b>   Transportökonomie [Transportation Economics]	527 - 528
<b>[WZ2936] Sustainable and Environmental Regulations</b>   Sustainable and Environmental Regulations	529 - 531
<b>[BGU38038] Urban Water-Energy-Food Nexus</b>   Urban Water-Energy-Food Nexus [WEF Nexus]	532 - 533
<b>[WZ0528] Urban Forestry</b>   Urban Forestry	534 - 536
<b>[WZ1344] Urban Agriculture</b>   Urban Agriculture	537 - 539

<b>[WZ2723] Utilization and Treatment of Special Materials and Waste  </b> Utilization and Treatment of Special Materials and Waste	540 - 541
<b>[LS10006] Vertical Farming (MSc.)   Vertical Farming (MSc.)</b>	542 - 543
<b>[WZ4201] Vegetation Ecology and Geographical Information Systems  </b> Vegetation Ecology and Geographical Information Systems	544 - 545
<b>[WZ0322] Ecological Colloquium: Scientific Foundations and</b> <b>Applications in Practice  </b> Ökologisches Kolloquium: Wissenschaftliche Grundlagen und Anwendungen in der Praxis [SciTravels]	546 - 548
<b>[WZ1413] Wildlife Monitoring in Ecology: Concepts, Methods and</b> <b>Application  </b> Wildlife Monitoring in Ecology: Concepts, Methods and Application	549 - 550
<b>[WZ2735] World Soil Resources  </b> World Soil Resources	551 - 552
<b>[WZ4198] Wildlife Management and Wildlife-Human Interactions  </b> Wildlife Management and Wildlife-Human Interactions	553 - 554
<b>[WZ4207] Waste and Waste Water Treatment  </b> Waste and Waste Water Treatment	555 - 557
<b>[WZ6432] Wildlife and Conservation Biology  </b> Wildlife and Conservation Biology	558 - 559
<b>[LS50016] Yale Field Trip with Preparatory Seminar  </b> Yale Field Trip with Preparatory Seminar [Yale]	560 - 561
<b>Course Achievement  </b> Studienleistungen	562
<b>[WZ4061] Internship  </b> Internship	562 - 564
<b>Master's Thesis  </b> Master's Thesis	565
<b>[WZ2754] Master's Thesis  </b> Master's Thesis	565 - 566

## Required Modules | Pflichtmodule

### Module Description

## WZ1823: Inventory Methods, Statistics and GIS | Inventory Methods, Statistics and GIS

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 110	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

### Description of Examination Method:

The learning success will be assessed by a written examination covering the knowledge and competence achieved in the three main branches of the module, namely GIS, Terrestrial Inventory Methods, Remote Sensing (RS), and Statistics. In GIS, a basic understanding of various GIS concepts and problem solution strategies is referred to.

### Repeat Examination:

Next semester

### (Recommended) Prerequisites:

None

### Content:

Implementation of basic concepts for acquisition, management, visualization of spatial data, and data evaluation as well as their inter-connection with tabular data from different source.

1. GIS: the focus is on the use of vector based GIS; the potentials of raster based GIS are demonstrated.
2. Terrestrial Inventory Methods: Introduction to sampling theory and application.
3. Remote Sensing (RS): Introduction to RS Principles: basic understanding of the physical background, on sensor concepts, evaluation strategies and spatial information extraction are elucidated.
4. Statistics in Resource Management: Justification of statistics, descriptive statistics and exploration: Frequencies and their graphical representation, distributions and their moments, testing hypotheses, regression analysis, post hoc tests, a priori contrasts, analysis of variance.

### **Intended Learning Outcomes:**

At the end of the courses on Inventory methods, GIS and Statistics the students are able to:

- select an appropriate GIS/Image Analysis program with respect to its intended field of application;
- apply a Geoinformatics tool (GIS and RS) to solve individual problems dealing with spatial information.
- understand the principles of sampling and how to assure the quality of a sample.
- understand the basic principles of remote sensing
- identify a geospatial problem and to decide on the appropriate RS system as well as on the data analysis strategy for the task to be supported.
- understand data analysis as a support for their Master's Thesis, understanding the formulation of hypotheses, the connection of statistics to epistemology, their preconditions for proper application and interpretation of the results, applying important statistical techniques.

### **Teaching and Learning Methods:**

The module includes lectures, exercises and accompanying examples.

### **Media:**

Online material available at [www.elearning.tum.de](http://www.elearning.tum.de); Slides with lectures downloadable from a platform to be announced.

### **Reading List:**

Environmental Systems Research Institute Inc.: Map Projections. Georeferencing spatial data, ESRI Press \* Zeiler, M.: Modelling Our World. The ESRI Guide to Geodatabase Design, ESRI Press \* Vienneau, A.: Using ArcCatalog, ESRI Press \* Minami, M.; Sakala, M.; Wrightsell, J.: Using ArcMap, ESRI Press \* Terrestrial Inventory Methods: Gregoire TG and Valentine HT (2008) Sampling strategies for natural resources and the environment. Boca Raton, Fla.; London, Chapman & Hall/CRC \* Mandallaz D (2008) Sampling techniques for forest inventories. Applied Environmental Statistics. Chapman and Hall. 276 p \* Introduction to Remote Sensing Principles: Richards, J.A., Jia, X.: Remote Sensing Digital Image Analysis - an introduction; Springer Press, Principles of Remote Sensing - an introductory textbook; Ed. L.L.F. Janssen, G.C. Huurneman, ITC educational textbook series; internet tutorials from ESA, DLR, NASA, CCRS, etc. \* Statistics with Microsoft Excel (4th Edition) by Beverly Jean Dretzke (Paperback - June 20, 2008) \* Discovering statistics using SPSS Field, Andy P. 2009

### **Responsible for Module:**

Knoke, Thomas; Prof. Dr. rer. silv.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Introduction to GIS (Vorlesung mit integrierten Übungen, 2 SWS)

Döllerer M

Statistics (Vorlesung, 1 SWS)

Knoke T

Inventory Methods (Vorlesung, 2 SWS)

Knoke T, Mengesha M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ2713: Methods of Scientific Communication | Methods of Scientific Communication

Version of module description: Gültig ab winterterm 2023/24

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 120	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a research paper (of around 12 pages), which is worked out in a group. That is the means to evaluate whether the students are able to apply the regulations of scientific writing in their own scientific paper. A short paragraph specifying their individual contribution must be provided in the paper following the research and publication ethics of international scientific journals. With starting the writing process of the research paper, an individual concept paper has to be submitted to show the efforts in individually contributing to the paper from the beginning as basis for their group discussions.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

The students acquire detailed and differentiated knowledge of scientific communication including the following topics:

- the communication process as two-way interaction
- group dynamics, dealing with difficult situations and facilitating conflict resolution in groups
- purpose of scientific writing
- procedure of scientific writing
- process of writing a scientific paper
- content details of the different chapters in a scientific paper
- creation and description of tables, graphs and charts
- looking for literature and data sources to write a scientific paper
- reflection and integration of feedback

### **Intended Learning Outcomes:**

By the means of the module the students are able to:

- understand the topic scientific writing
- apply the procedure of scientific writing
- analyze other scientific papers
- search, select and use literature sources
- create and deliver own scientific papers

### **Teaching and Learning Methods:**

Concerning teaching methods, lectures and videos provide theoretical foundations in scientific writing. Tasks are introduced to the students who are requested for completing them individually as homework. In order to familiarize students with the process of scientific writing, they work in groups to study specialist literature and data files that form the basis for writing a scientific paper under time constraint. On basis of critique reviews and feedback sessions by the lecturers, they revise the scientific paper.

### **Media:**

Power point presentation, lecture sheets, PDFs of scientific papers, PDFs of Guidelines, videos.

### **Reading List:**

Day, R.A.; Gastel, B.; 2012: How to write & publish a scientific paper. 7th edition, 2012, Cambridge University Press, pp. 300

Huss, J.; 2014: Schreiben und Präsentieren in den angewandten Naturwissenschaften. Ein Leitfaden. 2. Auflage. 256 Seiten. Verlag Kessel, Remagen-Oberwinter 2014. ISBN 978-3-941300-94-1.

TUM citation guideline

Summary guideline "How to write a scientific paper" within the seminar.

Other documents within the seminar, links to helpful videos and other information.

### **Responsible for Module:**

Weber-Blaschke, Gabriele; Apl. Prof. Dr. rer. silv.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Scientific Writing (Seminar, 2 SWS)

Weber-Blaschke G, Hijazi O

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1821: Natural Resources - Traits, Management and Theory of Sustainability | Natural Resources - Traits, Management and Theory of Sustainability

*Natural Resources - Traits, Management, Theory of Sustainability*

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The intended learning outcomes as defined below require a differentiated way of examination. A written exam (Klausur, 90 min) at the end of the semester will test whether the students sufficiently understand sustainability concepts and their connection to specific resources. As a midterm course achievement (voluntarily), external lecturer Dr. Savage offers the students topics for writing short reports about current global resource management problems as a homework, where they should show their ability to research and structure information and to identify crucial information gaps. Successful performance will improve the exam grade by 0.3.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

The module is intended to be a leitmotif during the first semester.

It consists of three basic units:

Unit 1 introduces the theory and the history of sustainability, supplemented by introducing interdisciplinary method knowledge.

Unit 2 introduces important natural resources, their specific traits in combination with sustainability challenges.

Unit 3 discusses case studies from interdisciplinary real-world-implementations.

Lecturers change during the semester. Each lecture is given by an expert in the specific field.

**Intended Learning Outcomes:**

At the end of the module the students understand the most important theories and perceptions of sustainable resource management as well as traits and challenges connected with essential natural resources. Moreover, they are able to apply this knowledge for critically questioning given real-world situations. This comprises the ability to assess strengths and weaknesses of given problem solution approaches (as presented in the media or specialist literature), and to outline possible approaches if confronted with a resource management problem.

**Teaching and Learning Methods:**

Depending on each lecture's specific contents and due to the modules' interdisciplinary character, teaching methods combine classic presentations, blended learning and group work.

**Media:**

presentations, worksheets, simulation models

**Reading List:**

Recommended up-to-date readings are supplied by the specific lecturers

**Responsible for Module:**

Biber, Peter; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Natural Resources - Traits, Management, Theory of Sustainability (Vorlesung, 5 SWS)  
Biber P [L], Biber P, Grambow M, Häberle K, Kasperidus H, Knoke T, Koppenborg F, Menzel A, Savage C, Schad P, Teixeira Pinto L

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1824: System Analysis and Introduction to Ecology | System Analysis and Introduction to Ecology

Version of module description: Gültig ab summerterm 2023

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In a written exam (Klausur, duration 90 min), the students' understanding of important ecological concepts and ecosystem dynamics' patterns is assessed. Moreover, in the same exam, we test their understanding of system analysis methods and their ability to apply them in ecological and other contexts by correctly solving specific problems given in the questions.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

This module combines an introduction to ecology with an introduction to analyzing and modelling dynamic systems. As ecosystems are intrinsically dynamic, i.e. governed by feedback structures, understanding dynamic systems is a key qualification for understanding ecological theory. By examples from ecology but also from other fields (in which cases, however, transfers to ecological applications are always highlighted) formal key methods in structuring system knowledge, building computer models, and learning from such models are taught. An important insight to convey is the interdisciplinarity of dynamic systems and the related methods: Feedback structures found in ecosystems can often as well be found in social science or engineering contexts and vice versa. Parallely, students get basic and advanced insights into fundamental elements of ecological concepts (e.g. modularity, unitariness, speciation, populations, metapopulations, competition, mutualism, ecosystems and their functions) and theory from the level of organisms to populations to species interactions up to the ecosystem level.

### **Intended Learning Outcomes:**

At the end of the module students understand essential elements of ecological theory and concepts. They remember important dynamic patterns and the ecological concepts behind. Moreover, they are able to apply key methods of system analysis to small and intermediate problems in ecology but also in other fields. The latter abilities include using causal loop diagrams and stock-and-flow diagrams for structuring information, understanding the basic mathematics behind dynamic models, being able to build small and intermediate simulation models, and to develop an understanding of the potential and limitations of computer simulations in general.

### **Teaching and Learning Methods:**

Lecture providing theoretical foundations in ecology. Interactive lecture in System Analysis, with an individual workstation being available for each student. In the beginning, the group is closely guided through simple problems in order to develop routine in the methodological and technical basics while understanding fundamental dynamic processes from exponential growth and decay up to  $n$ th order delays. Along with their increasing skills, students are given the opportunity to work more independently, with individual guidance upon request, about problems like different approaches to sustainable harvest or overshoot and collapse systems. This concept allows the lecturer to adjust the share of frontal teaching and independent work to the group's learning progress.

### **Media:**

Reading material provided by lecturers, power point presentations, modelling software VENSIM PLE, example models

### **Reading List:**

Begon, M., C. R. Townsend and J. L. Harper. 2006. Ecology: From Individuals to Ecosystems. Blackwell Publishing, Malden, MA.

H. Bossel: System Zoo 1 Simulation Models – Elementary Systems, Physics, Engineering. Books on Demand, Norderstedt, 2007 (ISBN 978-3-8334-8422-3).

H. Bossel: System Zoo 2 Simulation Models – Climate, Ecosystems, Resources. Books on Demand, Norderstedt, 2007 (ISBN 978-3-8334-8423-0).

H. Bossel: System Zoo 3 Simulation Models – Economy, Society, Development. Books on Demand, Norderstedt, 2007 (ISBN 978-3-8334-8424-7).

Ford, A. Modeling the Environment. Island Press, 1999.

Pruyt, E., 2013. Small System Dynamics Models for Big Issues: Triple Jump towards Real-World Complexity. Delft: TU Delft Library. ISBN/EAN: 978-94-6186-195-5 (Free e-book)

Sterman, J.D., Business Dynamics. McGraw-Hill Education, 2000.

Stiling, P. D. 2014. Ecology: Global Insights and Investigations. McGraw-Hill Education, UK.

### **Responsible for Module:**

Biber, Peter; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

System Analysis (Vorlesung, 2 SWS)

Biber P

Introduction into Ecology (Vorlesung, 2 SWS)

Meyer S [L], Meyer S, Heinen R, Weißer W, Achury Morales R, Joschinski J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Management Aspects | Management Aspects

### Module Description

## WI001228: Economics of Environmental and Climate Policy | Economics of Environmental and Climate Policy

Version of module description: Gültig ab winterterm 2019/20

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 0	<b>Contact Hours:</b> 150

Number of credits may vary according to degree program. Please see Transcript of Records.

### Description of Examination Method:

The performance of course participants is examined in form of a written exam (90 minutes) at the end of the semester. Closed, half-open and open-ended questions are used to test whether the students can economically analyze environmental and climate policy measures and explain the environmental policy practice using the New Political Economy. Answering the questions requires own formulations.

### Repeat Examination:

Next semester

### (Recommended) Prerequisites:

BSc.

### Content:

Evaluation criteria for environmental and climate policy measures based on welfare economics are used to derive a normatively optimal policy with regard to equity and temporal dimensions. We present economic cost-benefit analysis as a tool for the economic evaluation of environmental and climate protection measures. Subsequently, the suitability of environmental policy measures to overcome specific environmental problems is discussed. We compare a command and control approach with pollution taxes, pollution abatement subsidies and emissions trading. In addition to questions of allocation, the importance of transaction costs and technical progress is discussed. Against the background of environmental risks, the importance of property rights and liability rules is explained. An introduction to the public choice theory is given to explain the implementation of policy measures in practise. We discuss voter models for the analysis of political competition, decision-making rules and voting procedures, as well as the political influence of interest groups



and bureaucracy. Against the background of global environmental and climate protection problems, game-theoretical explanations are presented.

**Intended Learning Outcomes:**

In this course, policy measures for environmental and climate protection will be analysed theoretically based on welfare economic approaches whereas the implementation in practice will be discussed based on the public choice theory. The course attendees get to know valuation criteria for environmental and climate policy measures, which take into account temporal dimensions, risk considerations and aspects of equity. After successfully attending the module, the students are able to understand the effects of specific economic policy measures and to evaluate them in terms of welfare economics. With regard to the practical design of environmental and climate policy, the students acquire a comprehensive understanding of how political behaviour, collective decision-making processes and structures can be explained by using public choice theory. Attending the module enables the participants to analyse the individual and collective actions of political actors such as voters, administrations, parties and interest groups, as well as to apply game-theoretical explanations for international negotiations in the context of climate and global environmental problems.

**Teaching and Learning Methods:**

The module consists of lectures. A lecture is a suitable form of imparting the theoretical foundations of environmental and climate policy analysis. The lecturer explains the relevant content; questions from the students can be clarified during the lecture. This ensures that all students get an in-depth insight into the topics at the same level. The students are also encouraged to study the relevant literature.

**Media:**

Slides, Moodle

**Reading List:**

Fees, E (1998): Umweltökonomie und Umweltpolitik.  
Beckenbach et al. (2009): Diskurs Klimapolitik.  
Tietenberg, T. and L. Lewis (2010): Environmental Economics and Policy.  
Kirchgässner (2002): Demokratische Wirtschaftspolitik  
Martiensen, J. (2000): Institutionenökonomie.  
Weimann J. (1996): Wirtschaftspolitik.

**Responsible for Module:**

Roosen, Jutta; Prof. Dr. Ph.D.

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1822: Introduction to Economics and Business Ethics | Introduction to Economics and Business Ethics

Version of module description: Gültig ab summerterm 2015

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b>	<b>Contact Hours:</b>

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Current notice: Due to the continuing CoViD19-pandemic, the exam for this winter semester 2020/21 has been adjusted.

Students have the opportunity to participate in the written online examination, Online Proctored Exam (Onlineprüfungen: WZ1822o, WZ1822-1o und WZ1822-2o). These exams will parallelly be held as regular written exam in person (WZ1822, WZ1822-1 und WZ1822-2).

The written examination assesses the students' understanding of the basic concepts of microeconomic theory (module part introduction to economics) and major business ethical concepts and issues. Furthermore, the examination tests students' ability to precisely describe solutions, achieve certain results and reproduce standard arguments within a limited amount of time.

A Mid-Term assignment (presentation) assesses the students' ability to present a new topic in a comprehensible manner. It will serve for grade improvement by 0.3 according to §6 (5) APSO.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

#### Content:

The module is an introduction to Business Ethics and Economics. Business ethics introduces the student to classical concepts of duty, consequentialism and virtues, in particular modern management virtues. The classical concepts are applied to corporate social responsibility and corporate governance. CSR and corporate governance will be discussed in the light of globalization, the financial crisis of 2008 and major corporate scandals.

The module part “Introduction to Economics” provides an introduction into microeconomic theory and the interaction between economics and the environment. Based on consumer and producer theory, we analyze the interactions of demand and supply on markets. We analyze economic reasons for market failure and use welfare economic concepts to evaluate market interventions. In the final part, we look at principles of intertemporal efficiency and an economic perspective of sustainability.

**Intended Learning Outcomes:**

The major theoretical positions are reflected in public as well as private debates. Thus, understanding the structure of standard arguments contributes to the development of solution-oriented approach to ethical dilemmas and to the students’ rhetorical skills.

We will take hands on approach to CSR, focusing on Un Global Compact and specific CSR policies. This approach will prepare the student for practical challenges of implementing CSR policies. We will approach Corporate Governance in a similar manner, looking at cases of bad corporate governance, at codes of corporate governance and at the practical challenges of implementing stricter procedures in the organizations.

The lectures on power will introduce the students to a significant aspect of organizational interaction. We look at different ways to obtain power in an organizational context and we will investigate the opportunity for ethical action in a professional environment characterized by a more or less intensive power struggles. The analysis of consumer ethics will clarify why our environmentally damaging consumer habits are so difficult to change.

Students will learn about ways in which the economy and the environment are independent. They will understand the microeconomic theory of consumer and producer behaviour and reasons for market failure. They will be able to apply welfare economics to evaluate governmental market interventions. Furthermore, they will understand the temporal dimension of economic decisions and their implications for sustainability.

**Teaching and Learning Methods:**

2/3 lectures, 1/3 group work and student presentations

**Media:**

**Reading List:**

The texts will be provided on moodle

**Responsible for Module:**

PD. Dr. Thilo Glebe – Lehrstuhl für Volkswirtschaftslehre - Umweltökonomie und Agrarpolitik Alte Akademie 14; 85354 Freising; 08161-71-5965; [glebe@wzw.tum.de](mailto:glebe@wzw.tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Introduction to Economics (WZ1822) (Vorlesung, 2 SWS)

Glebe T [L], Glebe T

(WZ1822) Business Ethics (Vorlesung, 2 SWS)

Thejls Ziegler M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2712: Project Management and Cross Cultural Communication | Project Management and Cross Cultural Communication

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a written project report (10 pages) comprising a description of the relevant project planning tools. Additionally, an oral group presentation of the results is required. The project work will validate the student's ability to transform their project ideas into a project proposal including a corresponding work breakdown structure, while the presentation will allow assessing the ability to present a project idea to a professional audience, and to conduct a discussion about the presented issues. A voluntary mid-term assignment in form of a written report (2 pages) allows students to demonstrate their learning in cross-cultural communication. This assignment allows improving the examination mark by 0.3, and will be evaluated in a mid-term examination in the form of a written report.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

Objectives, dimensions and characteristics of project management; types of projects; project life cycle phases and work breakdown structures; project network diagrams and milestone plans; stakeholder analysis and management; risk analysis and management in projects; critical path method; financial project planning; project resource planning and control; team building skills. Dimensional model of culture; theory and practice of cross-cultural communication, exercises in dealing with different perceptions.

**Intended Learning Outcomes:**

At the end of the module, students are able to develop a detailed project plan and to understand related communication processes as well as apply that understanding to improve their task performance. They can present their results to specific target audiences in an organized manner. Additionally, they can organize ideas effectively and communicate them in a well-developed written report. Furthermore, students are able to understand cross-cultural differences and to apply techniques to avoid miscommunication in project management rooted in cross-cultural differences.

**Teaching and Learning Methods:**

Knowledge and skills are imparted by lectures as well as the flipped classroom method, individual and group work, presentation of case studies and peer discussions; the learning methods are definition and solving of problems, collaborative work, group discussions, preparation and implementation of presentations, report writing.

**Media:**

PowerPoint presentations, case studies, presentation notes and online resources

**Reading List:**

Hofstede, G., Hofstede, G.J. and Minkov, M. (2010): Cultures and Organizations: Software of the Mind. McGraw-Hill. Kerzner, H. (2017): Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Wiley; Meredith J.R., Mantel S.J., and Shafer, S.M. (2019): Project Management: A managerial approach. Wiley; Meyer, E. (2015): The Culture Map: Decoding How People Think, Lead, and Get Things Done Across Cultures. PublicAffairs. Project Management Institute (2017): A Guide to the Project Management Body of Knowledge (PMBOK Guide).

**Responsible for Module:**

Bitsch, Vera; Prof. Dr. Dr. h.c.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Project Management (WZ2712) (Vorlesung, 4 SWS)

Bitsch V [L], Bitsch V, Abate Kassa G

Cross Cultural Communications (WZ2712) (Seminar, 1 SWS)

Bitsch V [L], Bitsch V, Abate Kassa G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SOT86611: Sustainability Politics and Policy | Sustainability Politics and Policy

Version of module description: Gültig ab summerterm 2023

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The exam (100%) will consist of a portfolio of tasks that will relate to the different parts of the course which is co-taught by faculty teaching in the concentration area. The aim of this portfolio is to document the student's major activities and accomplishments throughout the course.

The portfolio will include a presentation (about 30 min, 50%) in the context of which they will interact with their peers. This will help them reflect on their academic goals and their progress as learners as regards the defined course objectives (see below).

Building on their presentations as well as on their reflections on the discussions in the lectures, they will later compile a report (about 10 pages, 50%) that will document what they have proceeded to learn. In the report, students will demonstrate that they have acquired the defined competencies (see below) and will reflect on their learning process.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

This module introduces students to theoretical debates about sustainable development and links the concept of sustainable development to different economic, social, environmental, and health policy areas. The lecture in this module examines the goals of "sustainable development" and the concepts of inter- and intra-generational justice. The module includes a historical overview of the sustainability concept looking into competing definitions and understandings. It investigates key theoretical and methodological approaches to examine such issues as rising government debt,

growing global competition for innovation, and intensifying global environmental degradation and resource scarcity. The lecture considers how policies differ in their "sustainability profiles" and the economic, social and political factors which are responsible for this variance.

**Intended Learning Outcomes:**

Upon completion of this module, students will be able to understand the roles and contributions different scientific and technological solutions as well as different social and behavioural approaches can play in designing, implementing and monitoring sustainable solutions. They will also be able to understand how different sustainability areas (e.g. economic, financial, educational, research, health, family, pension, mobility, environmental and energy policy) are being governed on the local, national and international levels. They will be able to highlight the interdisciplinary dimensions of sustainability, to analyse complex sustainability problems, and to develop concrete solutions.

**Teaching and Learning Methods:**

The course will be given as one lecture and will employ fitting methods to deepen the content such as exercises, group work or a laboratory.

**Media:**

Media like presentations, exercises, scripts and other media

**Reading List:**

Bornemann, Basil/ Knappe, Henrike/ Nanz, Patrizia (Ed.) 2022: The Routledge Handbook of Democracy and Sustainability. London: Routledge, 431-446. (<https://www.lehmanns.de/shop/technik/52507134-9780367109585-the-routledge-handbook-of-democracy-and-sustainability>)

Wurster, Stefan 2013: Comparing ecological sustainability in autocracies and democracies, in: Contemporary Politics, 2013, Vol. 19, No.1, 76-93. (<http://www.tandfonline.com/doi/abs/10.1080/13569775.2013.773204>)

A reader of texts with up-to-date and cutting edge scientific literature will be made available at the start of the semester.

**Responsible for Module:**

Wurster, Stefan; Prof. Dr. rer. pol.

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



**WZ2714: General Education Subject | General Education Subject****Languages | Sprachen****Module Description****SZ0118: Arabic A1.1 | Arabisch A1.1**

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

**Description of Examination Method:**

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion und werden in Form von kompetenz- und handlungsorientierten Portfolioaufgaben (Hilfsmittel erlaubt) sowie einem Abschlusstest abgehalten. Die Form und Bedingungen des Abschlusstests können je nach Abhaltungsformat der jeweiligen LV variieren (Online/Präsenz; mit/ohne Hilfsmittel) und werden rechtzeitig bekannt gegeben.

Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei: In diesem Falle beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).)

**Repeat Examination:****(Recommended) Prerequisites:**

keine

**Content:**

In diesem Modul werden neben der Einübung des arabischen Schrift- und Lautsystems Grundkenntnisse des Arabischen vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen - z.B. beim sich Begrüßen, beim Einkaufen, im Restaurant, und im öffentlichen Verkehr etc. - trotz geringer Sprachkenntnisse zurechtzufinden. Sie lernen/üben

grundlegendes Vokabular zu Themen wie Gesundheit, Familie, Beruf, einfache Fragen zur Person/zur Familie zu stellen und zu beantworten, Zahlen und Uhrzeiten zu verstehen und zu benutzen und in einfach strukturierten Hauptsätzen Alltägliches zu berichten. Entsprechende grammatikalische Themen werden behandelt. Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache eigenverantwortlich und effektiv zu gestalten.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 des GER. Der/Die Studierende erlangt Grundkenntnisse in Arabisch mit allgemeinsprachlicher Orientierung unter Berücksichtigung interkultureller und landeskundlicher Aspekte. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

Nach Abschluss dieses Moduls kann der/die Studierende alltägliche Ausdrücke und sehr einfache Sätze verwenden, die auf die Befriedigung konkreter Bedürfnisse des alltäglichen Bedarfs zielen: Er/Sie kann sich und andere vorstellen und Fragen zu ihrer Person stellen und auf Fragen dieser Art Antwort geben, in einfacher Weise Tagesabläufe beschreiben und einfache schriftliche Mitteilungen zur Person machen. Er/Sie ist in der Lage, Wünsche zu kommunizieren, wenn die Gesprächspartner deutlich und langsam sprechen und bereit sind zu helfen. Sowohl im schriftlichen als auch im mündlichen Sprachgebrauch ist der/die Studierende in der Lage, situationsadäquat, bzw. der A1.1-Stufe entsprechend, Wortschatz und Grammatik korrekt anzuwenden.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen in Einzel-, Partner- und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft. Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch wird in der LV bekannt gegeben.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Arabisch A1.1 (Seminar, 2 SWS)

Aboelgoud E, Köpfler I

Blockkurs Arabisch A1.1 (Seminar, 2 SWS)

## Köpfler I

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ03031: Intensive Course German as a Foreign Language A2.1 | Blockkurs Deutsch als Fremdsprache A2.1

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 120	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

1 final exam 90 min. (100%) - no learning aids permitted

The midterm exam is intended to monitor students' learning progress and reduce the amount of material covered in the final exam. Written exams will assess students level of acquisition of the learning outcomes specified in the module description. Specifically, exam questions focus on the usage of vocabulary and grammar, as well as reading comprehension and text production. Listening comprehension is tested by posing questions based on audio samples to which students respond in writing.

Verbal skills are evaluated using appropriate prompts from sample print dialogs.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Firm knowledge of level A1.2; placement test with the achievement A2.1

#### Content:

In this module, students acquire basic knowledge of the German language, including intercultural and regional aspects, that will enable them to express themselves in everyday situations, such as traveling, at the doctor's office, searching for an apartment, in a department store, among colleagues, friends or neighbors.

Students learn and practice basic vocabulary and expressions on topics such as education, profession, health and traveling. Students learn and practice using simply structured main and subordinate clauses (that, because, and, than, etc.), employing the preterit (modal verbs) and perfect, as well as the comparative, the superlative and the declination of the adjective. They reinforce and expand the usage of the prepositions in the accusative and dative case.

Students learn strategies for successful verbal and written communication despite minimal language skills. Opportunities will be made available for effective, self-motivated, independent learning. Students acquire teamwork skills through collaborative work in multinational mixed groups.

**Intended Learning Outcomes:**

The module is based on level A2 of GER.

Upon completion of this module, students are able to understand and use simple sentences and expressions in conversations on a broad spectrum of familiar topics. These conversations are based on basic information concerning everyday life and subjects relevant to studying or working, including sociocultural aspects of German-speaking countries.

For example, students are able to describe themselves and other people, their living situation, state of health, leisure time activities and job situation.

Students are able to understand longer texts and letters about familiar topics that include foreseeable information and are written in simple language about everyday life or job related topics. Students are able to compose short, informative texts or notifications about basic situations in everyday life or situations related to studying.

**Teaching and Learning Methods:**

The module consists of a seminar covering material appropriate to desired learning outcomes and encompassing relevant listening, reading, writing and speaking exercises. These exercises may take the form of individual, partner or group work, implementing a communicative and activity-oriented approach. Students have the opportunity to deepen basic knowledge conveyed in the seminar through independent study and work, using specified (online) materials covering fundamental grammar and communication patterns of the foreign language.

Voluntary homework (preparation and follow-up work) reinforces classroom and structured learning.

**Media:**

Textbook; multimedia-based teaching and learning materials (black board, overheads, exercise sheets, image, film, etc.) also online

**Reading List:**

to be announced in the Class

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Deutsch als Fremdsprache A2.1 (Seminar, 4 SWS)

Meuschel G, Schimmack B, Stoephasius J, Zerfass A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ03041: Intensive Course German as a Foreign Language A2.2 | Blockkurs Deutsch als Fremdsprache A2.2

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 120	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

1 final exam 90 min. (100%) - no learning aids permitted

The midterm exam is intended to monitor students' learning progress and reduce the amount of material covered in the final exam. Written exams will assess students level of acquisition of the learning outcomes specified in the module description. Specifically, exam questions focus on the usage of vocabulary and grammar, as well as reading comprehension and text production. Listening comprehension is tested by posing questions based on audio samples to which students respond in writing.

Verbal skills are evaluated using appropriate prompts from sample print dialogs.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Firm knowledge of level A2.1; placement test with the achievement A2.2

#### Content:

In this module, students acquire basic knowledge of the German language, including intercultural and regional aspects, that will enable them to express themselves in everyday situations, such as traveling, at the doctor's office, searching for an apartment, in a department store, among colleagues, friends or neighbors.

Students reinforce and augment basic vocabulary and expressions on topics such as education, profession, living and traveling. Students learn and practice classifying and using an extended spectrum of main and subordinate clauses (final clause, indirect questions, temporal subordinate clause, causal sentence). They also learn to employ the preterit (modals verbs) and perfect and will repeat and expand the usage of the prepositions and the declination of the adjective.

Students learn strategies for successful verbal and written communication despite minimal language skills. Opportunities will be made available for effective, self-motivated, independent learning. Students acquire teamwork skills through collaborative work in multinational mixed groups.

**Intended Learning Outcomes:**

The module is based on level A2 of GER.

Upon completion of this module, students are able to understand and use simple sentences and expressions in conversations on a broad spectrum of familiar topics. These conversations are based on basic information concerning everyday life and subjects relevant to studying or working, including sociocultural aspects of German-speaking countries.

For example, students are able to describe themselves and other people, their living situation, state of health, leisure time activities and job situation. Students are able to communicate in various situations, for example, when searching for an apartment, traveling or on holiday, and are able to report about their experiences in simple standard language.

Students are able to understand longer texts and letters about familiar topics that include foreseeable information and are written in simple language about everyday life or job related topics. Students are able to compose short, informative texts or notifications about basic situations in everyday life or situations related to studying.

**Teaching and Learning Methods:**

The module consists of a seminar covering material appropriate to desired learning outcomes and encompassing relevant listening, reading, writing and speaking exercises. These exercises may take the form of individual, partner or group work, implementing a communicative and activity-oriented approach. Students have the opportunity to deepen basic knowledge conveyed in the seminar through independent study and work, using specified (online) materials covering fundamental grammar and communication patterns of the foreign language.

Voluntary homework (preparation and follow-up work) reinforces classroom and structured learning.

**Media:**

Textbook; multimedia-based teaching and learning materials (black board, overheads, exercise sheets, image, film, etc.) also online

**Reading List:**

Textbook (to be announced in class)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Deutsch als Fremdsprache A2.2 (Seminar, 4 SWS)

Del Piano J, Schlüter J, Steidten R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ03061: Intensive Course German as a Foreign Language B1.2 | Blockkurs Deutsch als Fremdsprache B1.2

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 120	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

1 schriftlicher End Term Test 90 min. (100%) - keine Hilfsmittel erlaubt

In der schriftlichen Prüfung werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhaltet Fragen zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Leseverstehen, sowie Aufgaben zur freien Textproduktion. Das Hörverstehen wird anhand von Hörbeispielen mit Hörverstehens-Fragen überprüft, die schriftlich beantwortet werden müssen. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Sound knowledge of module B1.1; placement test level B1.2

#### Content:

In this module, knowledge of German as a foreign language will be further developed, enabling students to express themselves in German independently and confidently in familiar situations, e.g. in the classroom, at work, in free time and with family, on topics of general interest, e.g. films, music, sports, etc, when standard German is spoken. Students develop an expanded spectrum of vocabulary, figures of speech and idioms, discussion patterns, understand and use a basic repertoire of logical main and subordinate clauses (temporal clauses, causal clauses, infinitive clauses, final clauses, consecutive clauses and relative clause), verbs and nouns and expand their use of prepositions. They review and develop elementary aspects of grammar, such as the use of tenses, prepositions, adjective declensions and comparatives. They examine specific features of culture with regard to festivals and traditions, the educational system, the business world, lifestyles and leisure activities, and obtain insight into contemporary culture in Germany.



**Intended Learning Outcomes:**

The module refers to level B1 Independent Language Use of the CEFR. Students acquire knowledge of German as a foreign language at the standard language level with a focus on intercultural, cultural and academic aspects. Students obtain team competence through collaborative work in mixed, multinational groups. After completion of this module, students can make themselves understood in most situations likely to occur in the context of work, school and leisure, or while traveling in German-speaking regions. They can report on academic and business careers; describe plans and express hopes and wishes; make, accept or reject invitations; give advice and directions; express and discuss opinions. They can understand and summarize the general content of simple, authentic factual texts, literary texts, and radio and television programs and take part in spontaneous discussions on topics of general interest. Students can compose simple formal letters and longer personal letters and describe personal experiences. They can speak on everyday topics of personal interest in a structured fashion and produce a written text, taking a logically-defensible position on a current issue, when given assistance.

**Teaching and Learning Methods:**

The module consists of a seminar in which course objectives will be achieved in an activity-oriented, communicative atmosphere through listening, reading, writing and speaking exercises in individual, partner and group work. The fundamental language skills conveyed in the classroom are reinforced through the use of guided self-learning in the form of prepared (and online) materials. The basics of presenting and discussing everyday topics will be conveyed by means of the prescribed criteria and communicative patterns.

**Media:**

Textbook; multimedia teaching and learning materials (chalk/white board, overheads, worksheets, images, films, etc.) and online resources.

**Reading List:**

Textbook (to be announced in class)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### **SZ08011: Intensive Course Portuguese A1 | Blockkurs Portugiesisch A1**

## Module Description

### **SZ08061: Intensive Course Portuguese A2.1 | Blockkurs Portugiesisch A2.1**

## Module Description

### SZ0209: Chinese A1.1 | Chinesisch A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft.

Die Klausur beinhaltet Fragen zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie Aufgaben zur freien Textproduktion in Schriftzeichen/Pinyin und wird in Form von Präsenzprüfungen oder (Portfolio-)Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt.

Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. In diesem Fall beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Interesse an der chinesischen Sprache und Kultur ist empfehlenswert

#### Content:

Dieses Modul umfasst die Einführung in die chinesische Phonetik, elementare Vokabeln und Grammatik sowie die Einführung in die chinesischen Schriftzeichen. Mitgeteilt werden die Besonderheit der vier Töne im Hochchinesischen, der Aufbau der Schriftzeichen und die elementare Grammatikstruktur. Alltägliche Begrüßungsformen, Basisredewendungen und einfache Satzglieder sind Bestandteile dieses Moduls.

**Intended Learning Outcomes:**

Nach der Teilnahme an der Modulveranstaltung sind die Studierenden in der Lage, einen Überblick über die chinesische Sprache zu gewinnen. Sie haben auch den Grundwortschatz in chinesischen Schriftzeichen erworben.

**Teaching and Learning Methods:**

Einzelarbeit, Partnerarbeit, Gruppenarbeit. Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; Hör-, Lese- und Sprechübungen. Hausaufgaben zur Vor- und Nachbearbeitung sind freiwillig und fördern die Beherrschung der Zielsprache.

**Media:**

Lehrbuch, Übungsblätter, multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch wird in der LV bekanntgegeben,  
Vom Kursleiter selbst erstellte Materialien/Übungen

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Chinesisch A1.1 (Seminar, 2 SWS)

Kralle J, Lee M, Zhou H

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0211: Chinese A2.1 | Chinesisch A2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft.

Die Klausur beinhaltet Fragen zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie Aufgaben zur freien Textproduktion in Schriftzeichen/Pinyin und wird in Form von Präsenzprüfungen oder (Portfolio-)Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt.

Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. In diesem Fall beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Bestanden Abschlussklausur A1.2 oder gleichwertige Vorkenntnisse

#### Content:

Der Schwerpunkt dieses Moduls liegt in der Verfeinerung der Sprachkenntnisse. Kombination von verschiedenen Satzelementen wie Orts- und Zeitangaben sowie Äußerung von persönlichen Meinungen werden in diesem Modul erarbeitet.

#### Intended Learning Outcomes:

Die Studierenden sind nach der Teilnahme an der Modulveranstaltung in der Lage, genauere Aussagen zu machen und komplexere Äußerungen zu formulieren.

#### Teaching and Learning Methods:

Einzelarbeit, Partnerarbeit, Gruppenarbeit

Hausaufgaben zur Vor- und Nachbearbeitung sind freiwillig und fördern die Beherrschung der Zielsprache.

**Media:**

Lehrbuch, Übungsblätter, Audio-CD und multimedial gestützte Lehr- und Lernmaterialien

**Reading List:**

wird in der Veranstaltung bekanntgegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Chinesisch A2.1 (Seminar, 2 SWS)

Zhou H

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0303: German as a Foreign Language A2.1 | Deutsch als Fremdsprache A2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Performance, testing the learning outcomes specified in the module description, is examined by a cumulative portfolio of competence and action-oriented tasks. Aids are permitted.

The examination performances are designed in their entirety to test the use of vocabulary and grammar, reading and/or listening comprehension, and free text production.

Oral communication skills will be tested via the use of appropriate idioms in written dialogue examples and/or in the form of an audio/video file. For this purpose, we observe the Basic Data Protection Regulation (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

assured knowledge of level A1.2; placement test with result A2.1

#### Content:

This module teaches basic knowledge of German as a Foreign Language, taking into account intercultural and cultural aspects of the country, enabling students to cope in simple, routine situations, e.g. when traveling, at the doctor's, looking for an apartment, in the department store, among colleagues, friends and neighbors.

They will learn/practice vocabulary/expressions on topics such as study and training, work, housing, media, and travel. They learn/practice using basic main and subordinate clauses (e.g. dass, weil, und, denn, etc.), reporting in the past tense (modal verbs) and perfect tense, the use of the comparative and superlative forms, and the declension of the adjective. They review and expand the use of prepositions in the accusative and dative.



### **Intended Learning Outcomes:**

The module is oriented towards level A2 of the CEFR.

After completing this module, students will be able to understand and use simple sentences, phrases and idiomatic expressions in conversations on an extended range of familiar topics, such as basic information on everyday topics or topics relevant to studies or work, including cultural aspects of the country.

They can, for example, describe themselves and other people, personal living situation, state of health, leisure activities and basic work-related situations.

Students can understand longer texts and letters on familiar topics using common but simple everyday or work-related language and containing predictable information. They can write short, informative texts or messages on basic situations in everyday life and study.

### **Teaching and Learning Methods:**

The module consists of a seminar in which students study the learning content with targeted listening, reading, writing and speaking exercises. The communicative and action-oriented approach is implemented by combining these exercises in individual, partner and group exercises. Online material for controlled self-study of basic grammatical phenomena and communication patterns is provided to deepen and intensify the content taught during the course. Voluntary homework (for preparation and revision) consolidates what has been learned.

### **Media:**

Textbook; multimedia-supported teaching and learning material, also online.

### **Reading List:**

Textbook: will be announced in the course

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache A2.1 (Seminar, 4 SWS)

Aßmann J, Bauer G, Dechant S, Hanke C, Keza I, Kouhi S, Kummer-Rock A, Kutschker T, Lebling-Gemaljevic J, Meuschel G, Nierhoff-King B, Stiebeler H

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0304: German as a Foreign Language A2.2 | Deutsch als Fremdsprache A2.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht. Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe A2.1; Einstufungstest mit Ergebnis A2.2

#### Content:

In diesem Modul werden Grundkenntnisse in Deutsch als Fremdsprache unter Berücksichtigung interkultureller und landeskundlicher Aspekte vermittelt, die es den Studierenden ermöglichen, sich in einfachen, routinemäßigen Situationen zurechtzufinden, z.B. auf Reisen, beim Arzt, auf Wohnungssuche, im Kaufhaus, unter Kollegen, Freunden und Nachbarn.

Sie wiederholen und ergänzen grundlegendes Vokabular /Ausdrucksmöglichkeiten zu Themen wie Ausbildung, Beruf, Wohnen, Freizeit und Mobilität. Sie lernen/üben ein erweitertes Spektrum an Haupt- und Nebensätzen (z.B. indirekte Frage, temporaler Nebensatz) sowie den Konjunktiv II zu benutzen und sie wiederholen bzw. erweitern den Gebrauch der Präpositionen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern. Die Studierenden üben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A2 des GER.

Nach Abschluss dieses Moduls sind die Studierenden in der Lage im Gespräch einfache Sätze und Redewendungen zu einem erweiterten Spektrum an vertrauten Themen zu verstehen und zu gebrauchen. Dabei handelt es sich um grundlegende Informationen zu alltäglichen, oder studien- bzw. berufsrelevanten Themen unter Einbeziehung landeskundlicher Aspekte.

Sie können beispielsweise sich und andere Personen, die persönliche Wohnsituation, Gesundheitszustand, Freizeitverhalten und berufliche Situation im Präsens oder Perfekt beschreiben. Sie können Vorschläge machen und reagieren, Informationen austauschen und Ratschläge geben.

Die Studierenden können längere Texte und Briefe zu vertrauten Themen verstehen, in denen gängige aber einfache alltags- oder berufsbezogene Sprache verwendet wird und in denen vorhersehbare Informationen zu finden sind. Sie sind in der Lage kurze, informative Texte oder Mitteilungen zu grundlegenden Situationen in Alltag und Studium zu verfassen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online

**Reading List:**

Lehrbuch: wird im Kurs bekannt gegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache A2.2 (Seminar, 4 SWS)

Aßmann J, Bauer G, Comparato G, Dechant S, Feistle C, Hagner V, Körner C, Kostial M, Kovacs O, Meuschel G, Nierhoff-King B, Reulein C, Thiessen E

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0321: German as a Foreign Language A1.1 plus A1.2 | Deutsch als Fremdsprache A1.1 plus A1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 8	<b>Total Hours:</b> 270	<b>Self-study Hours:</b> 180	<b>Contact Hours:</b> 90

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in Deutsch als Fremdsprache unter Berücksichtigung interkultureller und landeskundlicher Aspekte vermittelt, die es den Studierenden ermöglichen, sich trotz geringer Sprachkenntnisse z.B. beim Einkaufen, im Restaurant, im öffentlichen Verkehr etc. zurechtzufinden.

Sie lernen/üben grundlegendes Vokabular zu Themen wie Familie, Beruf, Freizeit, Einkaufen, Wohnen, Reisen und Gesundheit, einfache Gespräche in alltäglichen Situationen zu führen und in Hauptsätzen Alltägliches im Präsens und Perfekt zu berichten, unter Verwendung von Nomen,

Verben, Pronomen und Possessivartikeln, Modalverben, Imperativ und grundlegender lokaler und temporaler Präpositionen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache eigenverantwortlich und effektiv zu gestalten. Die Studierenden üben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 des GER.

Nach Abschluss dieses Moduls sind die Studierenden in der Lage alltägliche Ausdrücke und einfache Sätze zu verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen:

Sie können einfache Fragen in alltäglichen Situationen stellen und beantworten, Tagesabläufe in Vergangenheit und Gegenwart beschreiben und einfache schriftliche Mitteilungen zur Person machen, Verabredungen treffen und in grundlegenden alltäglichen Situationen beispielsweise beim Einkauf oder im Restaurant ihre Wünsche erfolgreich kommunizieren, wenn die Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online

**Reading List:**

Lehrbuch: wird im Kurs bekannt gegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache A1.1 plus A1.2 (Seminar, 6 SWS)

Nierhoff-King B, Schlömer A, Schlüter J, Steidten R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0322: German as a Foreign Language A2.1 plus A2.2 | Deutsch als Fremdsprache A2.1 plus A2.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 8	<b>Total Hours:</b> 270	<b>Self-study Hours:</b> 180	<b>Contact Hours:</b> 90

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe A1.2; Einstufungstest mit Ergebnis A2.1

#### Content:

In diesem Modul werden Grundkenntnisse in Deutsch als Fremdsprache unter Berücksichtigung interkultureller und landeskundlicher Aspekte vermittelt, die es den Studierenden ermöglichen, sich in einfachen, routinemäßigen Situationen zurechtzufinden, z.B. auf Reisen, beim Arzt, auf Wohnungssuche, im Kaufhaus, unter Kollegen, Freunden und Nachbarn.

Sie lernen/üben grundlegendes Vokabular/Ausdrucksmöglichkeiten zu Themen wie Ausbildung, Beruf, Gesundheit und Reisen. Sie lernen/üben ein erweitertes Spektrum an Haupt- und Nebensätzen zu klassifizieren und zu benutzen (Finalsatz, Infinitivsatz, indirekte Frage, temporaler Nebensatz, Kausalsatz), im Präteritum, Perfekt und Plusquamperfekt zu berichten, den Gebrauch

des Komparativ und des Superlativ, die Deklination des Adjektivs (im Nominativ, Akkusativ und Dativ) und Sie wiederholen und erweitern den Gebrauch der Präpositionen im Akkusativ und Dativ. Es werden Strategien vermittelt, die mündlich wie schriftlich eine Verständigung trotz noch geringer Sprachkenntnisse ermöglichen. Außerdem werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern. Die Studierenden üben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A2 des GER. Nach Abschluss dieses Moduls sind die Studierenden in der Lage im Gespräch einfache Sätze und Redewendungen zu einem erweiterten Spektrum an vertrauten Themen zu verstehen und gebrauchen. Dabei handelt es sich um grundlegende Informationen zu alltäglichen, oder studien- bzw. berufsrelevanten Themen unter Einbeziehung landeskundlicher Aspekte.

Sie können beispielsweise sich und andere Personen, persönliche Wohnsituation, Gesundheitszustand, Freizeitverhalten und berufliche Situation beschreiben. Sie können sich bei der Wohnungssuche und in wesentlichen Situationen im Urlaub oder auf Reisen verständigen und von daraus resultierenden Erfahrungen und Erlebnissen in einfacher Standardsprache berichten. Die Studierenden können längere Texte und Briefe zu vertrauten Themen verstehen, in denen gängige aber einfache alltags- oder berufsbezogene Sprache verwendet wird und in denen vorhersehbare Informationen zu finden sind. Sie sind in der Lage kurze, informative Texte oder Mitteilungen zu grundlegenden Situationen in Alltag und Studium zu verfassen.

### **Teaching and Learning Methods:**

Die LV besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online

### **Reading List:**

Lehrbuch: wird im Kurs bekannt gegeben

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache A2.1 plus A2.2 (Seminar, 6 SWS)

Stoephasius J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ0323: German as a Foreign Language B1.1 plus B1.2 | Deutsch als Fremdsprache B1.1 plus B1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 8	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe A2.2; Einstufungstest mit Ergebnis B1.1

#### Content:

In diesem Modul werden Kenntnisse in Deutsch als Fremdsprache unter Berücksichtigung interkultureller, landeskundlicher, und studienbezogener Aspekte erarbeitet, die es den Studierenden ermöglichen, sich in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse wie Film, Musik, Sport etc. selbständig und sicher in der Zielsprache zu verständigen, wenn Standardsprache verwendet wird.

Es werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiv zu gestalten und damit die eigene Lernfähigkeit zu verbessern.

Die Studierenden erarbeiten ein erweitertes Spektrum an Vokabular, Redewendungen und Dialogmustern, erfassen und benutzen ein grundlegendes Repertoire an logischen Haupt- und Nebensatz-Strukturen (z.B. Temporalsatz, Kausalsatz, Infinitiv-Satz, Finalsatz, Konsekutivsatz, Relativsatz). Sie erarbeiten den Gebrauch reflexiver Verben sowie den Gebrauch von Verben und Nomen mit Präpositionalergänzung. Sie lernen/üben die Funktion und den Gebrauch des Konjunktiv II, des Futur I und des Passiv. Sie wiederholen und ergänzen elementare Aspekte der Grammatik wie den Gebrauch der Zeiten, der Präpositionen, der Deklination des Adjektivs und der Komparation.

Die Studierenden beschäftigen sich mit kulturspezifischen Besonderheiten, beispielsweise in Bezug auf Feste und Gebräuche, Ausbildungssysteme, Berufswelt, Lebensformen und Freizeitverhalten und gewinnen Einblicke in die zeitgenössischen Kulturszene Deutschlands. Die Studierenden üben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1 des GER.

Nach Abschluss des Moduls sind die Studierenden in der Lage sich in den meisten Situationen, denen man in Studium oder Beruf, Freizeit und auf Reisen im Sprachgebiet begegnet, sicher zu verständigen. Sie können Aspekte des schulischen und beruflichen Werdegangs referieren, Pläne, Wünsche und Hoffnungen äußern, Einladungen aussprechen, annehmen oder ablehnen, Ratschläge und Anweisungen erteilen, Meinungen äußern und argumentieren.

Sie können wesentliche Inhalte in einfachen, authentischen Sachtexten, Fernseh- oder Radiosendungen und literarischen Texten verstehen und wiedergeben und sich spontan an Gesprächen zu Themen von allgemeinem Interesse beteiligen. Sie können einfache formelle Briefe und längere persönliche Briefe verfassen und von persönlichen Erfahrungen berichten. Sie können strukturiert zu einem alltäglichen Thema von persönlichem Interesse referieren und schriftlich eine logisch begründete Stellungnahme zu einem aktuellen Thema verfassen, wenn Hilfestellung gegeben wird.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Durch kontrolliertes Selbstlernen grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Anhand vorgegebener Kriterien und Kommunikationsmuster werden Grundlagen des Referierens und des Diskutierens zu alltäglichen Themen vermittelt.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online

**Reading List:**

Lehrbuch: wird im Kurs bekannt gegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache B1.1 plus B1.2 (Seminar, 6 SWS)

Hanke C, Hartkopf D, Karsten-Ott M, Kraut-Schindlbeck S, Stoephasius J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0337: German as a Foreign Language A1.1 | Deutsch als Fremdsprache A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 135	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Performance, testing the learning outcomes specified in the module description, is examined by a cumulative portfolio of competence and action-oriented tasks. Aids are permitted.

The examination performances are designed in their entirety to test the use of vocabulary and grammar, reading and/or listening comprehension, and free text production.

Oral communication skills will be tested via the use of appropriate idioms in written dialogue examples and/or in the form of an audio/video file. For this purpose, we observe the Basic Data Protection Regulation (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

none

#### Content:

This module teaches basic knowledge of German as a Foreign Language, taking into account intercultural and cultural aspects of the country, which will enable students to find their way around despite their limited knowledge of the language, e.g. when shopping, in restaurants, on public transport, etc.

They will learn/practice basic vocabulary on topics such as family, work, leisure and food, ask and answer simple personal/family questions, understand and use numbers, prices and times and report everyday activities in simple structured main sentences in the present tense, using verbs, nouns, personal pronouns, possessive articles and negation forms.

Students practice teamwork skills by collaborating on tasks in multinational groups.

**Intended Learning Outcomes:**

The module is oriented towards level A1 of the CEFR. After completing this module, students will be able to use everyday expressions and very simple sentences aimed at meeting specific needs of everyday life: They can introduce themselves and others and ask other people questions about themselves and give answers to questions of this kind. They can describe daily routines in basic structures and give basic information about themselves in writing. They can communicate their needs if interlocutors speak clearly and slowly and are supportive. Students learn how to organize their own learning process of the foreign language independently and effectively.

**Teaching and Learning Methods:**

The module consists of a seminar in which students study the learning content with targeted listening, reading, writing and speaking exercises. The communicative and action-oriented approach is implemented by combining these exercises in individual, partner and group exercises. Online material for controlled self-study of basic grammatical phenomena and communication patterns is provided to deepen and intensify the content taught during the course. Voluntary homework (for preparation and revision) consolidates what has been learned.

**Media:**

Textbook, multimedia-supported teaching and learning material, also online

**Reading List:**

Textbook: will be announced in the course

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache A1.1 (Seminar, 3 SWS)

Ammelung A, Burmasova S, Comparato G, Grgic T, Gröbl J, Huber D, Jennert J, Karsten-Ott M, Lechle K, Noch nicht bekannt N, Pinskaia I, Pletschacher T, Schlömer A, Schmidt-Bender S, Schneider S, Selent D, Steidten R, von Caprivi Caprara de Montecucculi A, Witzig B

Blockkurs Deutsch als Fremdsprache A1.1 (Seminar, 3 SWS)

Comparato G, Hanke C, Lechle K, Schlömer A, Selent D, Zerfass A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0338: German as a Foreign Language A1.2 | Deutsch als Fremdsprache A1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 135	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe A1.1; Einstufungstest mit Ergebnis A1.2

#### Content:

In diesem Modul werden Grundkenntnisse in Deutsch als Fremdsprache unter Berücksichtigung interkultureller und landeskundlicher Aspekte vermittelt, die es den Studierenden ermöglichen, sich trotz geringer Sprachkenntnisse z.B. beim Einkaufen, im Restaurant, im öffentlichen Verkehr etc. zurechtzufinden.

Sie lernen/üben grundlegendes Vokabular zu Themen wie Familie, Studium und Beruf, Freizeit, Wohnen, Gesundheit, Einkaufen und Reisen zu benutzen und in einfach strukturierten Hauptsätzen Alltägliches im Präsens und Perfekt zu berichten, unter Verwendung von

Modalverben, trennbaren Verben, Imperativ und grundlegender lokaler und temporaler Präpositionen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache eigenverantwortlich und effektiv zu gestalten. Die Studierenden üben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 des GER.

Nach Abschluss dieses Moduls sind die Studierenden in der Lage alltägliche Ausdrücke und einfache Sätze zu verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen:

Sie können einfache Fragen in alltäglichen Situationen stellen und beantworten, Tagesabläufe in Vergangenheit und Gegenwart beschreiben und einfache schriftliche Mitteilungen zur Person machen, Verabredungen treffen und in grundlegenden alltäglichen Situationen beispielsweise beim Einkauf oder im Restaurant ihre Wünsche erfolgreich kommunizieren, wenn die Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online

**Reading List:**

Lehrbuch: wird im Kurs bekannt gegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache A1.2 (Seminar, 3 SWS)

Bakker S, Grgic T, Hanke C, Jennert J, Khvintelani N, Kummer-Rock A, Menck-Zwick C, Noch nicht bekannt N, Pinskaia I, Pletschacher T, Schneider S, Thiessen E, Zerfass A

Blockkurs Deutsch als Fremdsprache A1.2 (Seminar, 3 SWS)

Jennert J, Mayr-Sieber T, Menck-Zwick C, Winkler S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0339: German as a Foreign Language B2.1 | Deutsch als Fremdsprache B2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe B1.2; Einstufungstest mit Ergebnis B2.1

#### Content:

Das Modul orientiert sich am Niveau B2 des GER. In diesem Modul werden Kenntnisse in Deutsch als Fremdsprache erarbeitet, die den Studierenden eine mündliche Diskurspartizipation zu aktuellen und wissenschaftlichen Themen ermöglicht. Die Studierenden behandeln Themen des Satzbaus und vertiefen ihre Kenntnisse zum Passiv sowie Strukturen, die für das Vergleichen relevant sind. Sie erweitern ihr Repertoire an Nomen, Verben und Präpositionen sowie an festen Verbindungen. Ein umfangreicher und differenzierter Wortschatz zu interkulturellen, sprachlichen und studienrelevanten Themen wird erarbeitet. Die Studierenden lernen den Gebrauch von



spezifischen Redemitteln für Meinungsäußerung, vergleichende Argumentation und persönliche Erfahrungsberichte.

**Intended Learning Outcomes:**

Im Anschluss an die Teilnahme an den Modulveranstaltungen können die Studierenden wesentliche Inhalte von authentischen Artikeln und Berichten aus dem eigenen Fach- und Interessensgebiet selbständig verstehen und wiedergeben. Sie sind in der Lage, in einer Diskussion oder Präsentation Standpunkte darzulegen, wobei sie komplexe Satzstrukturen und fachspezifisches Vokabular benutzen. Sie können begründen, warum sie einer bestimmten Meinung sind, und die Standpunkte anderer kommentieren.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen in Einzel-, Partner- und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch kontrolliertes Selbstlernen sollen von den Studierenden eigenständig Grammatikthemen und Wortschatzübungen mit vorgegebenen (Online-) Materialien erarbeitet werden. Freiwillige Hausaufgaben (zur Vor- und Nachbereitung der Lehrveranstaltung) festigen das Gelernte.

**Media:**

Lehrbuch, multimedial gestütztes Lehr- und Lernmaterial, auch online

**Reading List:**

Lehrbuch: wird im Kurs bekannt gegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache B2.1 (Seminar, 2 SWS)

Comparato G, Huber D, Kraut-Schindlbeck S, Mielert A, Schlüter J, Thiessen E, Willy P, Witzig B

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0340: German as a Foreign Language B2.2 | Deutsch als Fremdsprache B2.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe B2.1; Einstufungstest mit Ergebnis B2.2

#### Content:

Das Modul orientiert sich am Niveau B2 des GER. In diesem Modul werden Kenntnisse in Deutsch als Fremdsprache erarbeitet, die es Studierenden ermöglichen, über allgemeine und berufsbezogene Themen aktiv und annähernd flüssig zu kommunizieren. Anhand von Lese- und Hörtexten zu verschiedenen Themen lernen die Studierenden, Inhalte mündlich und schriftlich kohärent zusammenzufassen und Vor- und Nachteile abzuwägen und Stellung zu nehmen. Die Studierenden erarbeiten sich ein Spektrum an themenbezogenem Vokabular, Redemitteln und Textbausteinen, die sie für das Zusammenfassen von Texten und den Austausch von Argumenten benötigen. Sie analysieren den Satzbau in komplexen Sätzen, setzen sich mit den entsprechenden

grammatischen Strukturen (wie z.B. Konnektoren, Kohäsionsmitteln und Partizipien) auseinander und vertiefen ihre Kenntnisse zur Wortbildung und den Nominalisierungsmöglichkeiten.

**Intended Learning Outcomes:**

Im Anschluss an die Teilnahme an den Modulveranstaltungen können die Studierenden den Inhalt von Texten zu allgemeinen und berufsbezogenen Themen verstehen und mündlich und schriftlich kohärent wiedergeben. Sie sind in der Lage, mündlich und schriftlich Argumente zu verschiedenen, mitunter auch kontrovers diskutierten Themen zu formulieren, gegeneinander abzuwägen und Stellung zu beziehen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen in Einzel-, Partner- und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch kontrolliertes Selbstlernen sollen von den Studierenden eigenständig Grammatikthemen und Wortschatzübungen mit vorgegebenen (Online-) Materialien erarbeitet werden. Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung der Lehrveranstaltung) festigen das Gelernte.

**Media:**

Lehrbuch, multimedial gestütztes Lehr- und Lernmaterial, auch online

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache B2.2 (Seminar, 2 SWS)

Huber D, Niehaus B, Schimmack B, Schmid P, Schmidt-Bender S, Stiebeler H, Zendath I

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0341: German as a Foreign Language C1.1 | Deutsch als Fremdsprache C1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft.

Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe B2.2; Einstufungstest mit Ergebnis C1.1

#### Content:

In diesem Modul werden Kenntnisse in Deutsch als Fremdsprache auf gehobenem schriftsprachlichen Niveau unter Berücksichtigung interkultureller, landeskundlicher und studienbezogener Aspekte erarbeitet.

Die Studierenden überprüfen und vertiefen anhand komplex aufgebauter und anspruchsvoll formulierter Hör- und Lesetexte zu Themen von gesamtgesellschaftlichem Interesse ihre Fähigkeiten, ohne große Mühe und überwiegend flüssig in der Fremdsprache zu agieren.

Sie lernen, Textsorten und Schreibstile zu unterscheiden und situationsadäquat anzuwenden. Sie üben, komplexe Sachtexte auch außerhalb des eigenen Fachgebietes zu analysieren, zu komprimieren und kritisch mündlich sowie schriftlich zu kommentieren.

Sie üben, längeren Redebeiträgen, Vorträgen, Reportagen etc. detaillierte Informationen zu entnehmen. Sie lernen, Bedeutungsnuancen verwandter Ausdrücke zu differenzieren und Redewendungen zu verstehen, und sie vertiefen ein differenziertes Repertoire an Ausdrucksvarianten anhand verschiedener aktueller Themen. Positionen des öffentlichen Diskurses werden dabei auch nach ihrer kulturellen Bedingtheit hinterfragt.

Parallel beschäftigen sich die Studierenden mit ausgewählten grammatischen Phänomenen. Dabei liegt der Schwerpunkt auf Konnektoren, sowie den Unterschieden bei Nominal- und Verbalstil.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau C1 des GER.

Die Studierenden können den Inhalt von komplexen Artikeln und Berichten auch außerhalb des eigenen Fach- und Interessengebiets selbstständig und vielfach mühelos verstehen und Standpunkte identifizieren.

Sie können längeren Redebeiträgen und Vorträgen zu aktuellen Themen wie auch Fachvorträgen innerhalb und außerhalb ihres Fachgebietes folgen, sofern sie klar vorgetragen werden.

Sie sind in der Lage, zu aktuellen Themen aus Wissenschaft und Sozialleben ausführlich und logisch nachvollziehbar Stellung zu beziehen, sowie zu Themen aus ihrem Interessen- oder Fachgebiet klar strukturiert und verständlich zu referieren.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen in Einzel-, Partner- und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Ergänzend sollen die Teilnehmenden durch kontrolliertes Selbstlernen ausgewählte Grammatikthemen und Wortschatzübungen mit vorgegebenen Materialien eigenständig erarbeiten.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online

### **Reading List:**

Lehrbuch: wird im Seminar bekannt gegeben.

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Deutsch als Fremdsprache C1.1 (Seminar, 2 SWS)

Steidten R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0350: German as a Foreign Language B1.1 | Deutsch als Fremdsprache B1.1

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 135	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe A2.2; Einstufungstest mit Ergebnis B1.1

#### Content:

In diesem Modul werden Kenntnisse in Deutsch als Fremdsprache unter Berücksichtigung interkultureller, landeskundlicher und studienbezogener Aspekte erarbeitet, die es den Studierenden ermöglichen, sich in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse wie Konsum, Zukunft, Umwelt etc. selbständig und sicher in der Zielsprache zu verständigen, wenn Standardsprache verwendet wird.

Die Studierenden erweitern und benutzen ein grundlegendes Repertoire an logischen Haupt- und Nebensatz-Strukturen (z.B. Konsekutivsatz, Finalsatz und Relativsatz) und an Verben und Nomen mit Präpositionalergänzung. Sie lernen/üben den Genitiv, die Funktion und den Gebrauch des

Konjunktiv II und des Futur I. Sie wiederholen und ergänzen elementare Aspekte der Grammatik wie den Gebrauch der Zeiten und der Präpositionen.

Die Studierenden beschäftigen sich mit kulturspezifischen Besonderheiten, beispielsweise in Bezug auf Reiseverhalten, Berufswelt und Bewerbung sowie individuelle Zukunftskonzepte. Sie gewinnen Einblicke in aktuelle Themen wie Umwelt und Naturschutz.

Es werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern.

Die Studierenden üben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1 des GER.

Nach Abschluss des Moduls sind die Studierenden in der Lage sich in den meisten Situationen, denen man in Studium, Beruf und Freizeit im Sprachgebiet begegnet, sicher zu verständigen. Sie können über Vorlieben und Zukunftsvorstellungen sprechen, von Veränderungen berichten und Folgen ausdrücken, sich zur Berufswelt und Bewerbungen äußern sowie über umweltrelevante Themen diskutieren und eigene Ziele formulieren.

Sie können wesentliche Inhalte in einfachen, authentischen Texten aus alltäglichen Bereichen verstehen und wiedergeben und sich spontan an Gesprächen zu vertrauten Themen beteiligen.

Sie können längere persönliche E-Mails, Blog-Einträge und Texte zu eigenen Erfahrungen verfassen.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Durch kontrolliertes Selbstlernen grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online

### **Reading List:**

Lehrbuch: wird im Kurs bekannt gegeben

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0351: German as a Foreign Language B1.2 | Deutsch als Fremdsprache B1.2

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 135	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

gesicherte Kenntnisse der Stufe B1.1; Einstufungstest mit Ergebnis B1.2

#### Content:

In diesem Modul werden Kenntnisse in Deutsch als Fremdsprache unter Berücksichtigung interkultureller, landeskundlicher, und studienbezogener Aspekte erarbeitet, die es den Studierenden ermöglichen, sich in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse wie Gesundheit, soziales Engagement, Kunst etc. selbständig und sicher in der Zielsprache zu verständigen, wenn Standardsprache verwendet wird.

Die Studierenden erarbeiten ein erweitertes Spektrum an Vokabular, Redewendungen und Dialogmustern, erfassen und benutzen ein grundlegendes Repertoire an logischen Haupt-



und Nebensatz-Strukturen (Temporalsatz, Relativsatz, Vergleichssatz) und an zweiteiligen Konnektoren. Sie lernen/üben den Gebrauch reflexiver Verben und das Passiv. Sie wiederholen und ergänzen elementare Aspekte der Grammatik wie den Gebrauch der Zeiten, der Präpositionen, der Deklination des Adjektivs und der Komparation.

Die Studierenden beschäftigen sich mit kulturspezifischen Besonderheiten, beispielsweise in Bezug auf Freundschaft und Beziehungen, Großstadtleben und soziale Projekte, und sie gewinnen Einblicke in die zeitgenössischen Kulturszene Deutschlands.

Es werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern.

Die Studierenden üben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1 des GER.

Nach Abschluss des Moduls sind die Studierenden in der Lage sich in den meisten Situationen, denen man in Studium oder Beruf, Freizeit und auf Reisen im Sprachgebiet begegnet, sicher zu verständigen. Sie können z.B. Informationen aus Zeitungstexten weitergeben, über lebenswerte Städte diskutieren, Personen und Dinge genauer beschreiben, Meinungen äußern und argumentieren.

Sie können wesentliche Inhalte in einfachen, authentischen Sachtexten, literarischen Texten und in Fernseh- oder Radiosendungen verstehen und wiedergeben und sich spontan an Gesprächen zu Themen von allgemeinem Interesse beteiligen. Sie können einfache formelle E-Mails und längere persönliche Briefe verfassen und von persönlichen Erfahrungen berichten. Sie können strukturiert zu einem alltäglichen Thema von persönlichem Interesse referieren und schriftlich eine logisch begründete Stellungnahme zu einem aktuellen Thema verfassen, wenn Hilfestellung gegeben wird.

### **Teaching and Learning Methods:**

In diesem Modul werden Kenntnisse in Deutsch als Fremdsprache unter Berücksichtigung interkultureller, landeskundlicher, und studienbezogener Aspekte erarbeitet, die es den Studierenden ermöglichen, sich in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse wie Gesundheit, soziales Engagement, Kunst etc. selbständig und sicher in der Zielsprache zu verständigen, wenn Standardsprache verwendet wird.

Die Studierenden erarbeiten ein erweitertes Spektrum an Vokabular, Redewendungen und Dialogmustern, erfassen und benutzen ein grundlegendes Repertoire an logischen Haupt- und Nebensatz-Strukturen (Temporalsatz, Relativsatz, Vergleichssatz) und an zweiteiligen Konnektoren. Sie lernen/üben den Gebrauch reflexiver Verben und das Passiv. Sie wiederholen und ergänzen elementare Aspekte der Grammatik wie den Gebrauch der Zeiten, der Präpositionen, der Deklination des Adjektivs und der Komparation.

Die Studierenden beschäftigen sich mit kulturspezifischen Besonderheiten, beispielsweise in Bezug auf Freundschaft und Beziehungen, Großstadtleben und soziale Projekte, und sie gewinnen Einblicke in die zeitgenössischen Kulturszene Deutschlands.

Es werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern.

Die Studierenden üben Teamkompetenz durch kooperatives Handeln in multinational gemischten Gruppen.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online

**Reading List:**

Lehrbuch: wird im Kurs bekannt gegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0501: French A1.1 | Französisch A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Französisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen trotz noch geringer Sprachkenntnisse zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.

Die Studierenden lernen und üben einfache Fragen zur Person zu stellen und zu beantworten, sich in einer Stadt zu orientieren, Interessen auszudrücken und Formulare auszufüllen. Es werden u.a. folgende grammatische Themen behandelt, wie z.B. Präsensformen regelmäßiger und einiger unregelmäßiger Verben, Personalpronomen, bestimmte, unbestimmte und Teilungs-Artikel, Fragesätze, Angleichung der Adjektive. Es werden Strategien vermittelt, die eine Verständigung trotz noch geringer Sprachkenntnisse in alltäglichen Grundsituationen ermöglichen.

Außerdem werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch effektiver zu gestalten und die eigene Lernfähigkeit zu verbessern.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau „A1 – Elementare Sprachverwendung“ des GER. Der/die Studierende ist nach der Teilnahme an der Modulveranstaltung in der Lage, einfache Fragen über vertraute Themen zu stellen und zu beantworten. Er/sie kann sich auf einfache Art verständigen, wenn die Gesprächspartnerinnen oder Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen. Er/sie kann einfache schriftliche Mitteilungen zur Person machen. Sowohl im mündlichen als auch im schriftlichen Sprachgebrauch ist der/die Studierende in der Lage, situationsadäquat, bzw. der A 1-Stufe entsprechend, Wortschatz und Grammatik korrekt anzuwenden.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

**Reading List:**

Lehrbuch (wird im Kurs bekanntgegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Französisch A1.1 (Seminar, 2 SWS)

Bartanus J, Bruel J, Delavigne C, Gommeringer-Depraetere S, Kirchhoff A, Noch nicht bekannt N, Perconte-Duplain S, Suek C

Blockkurs Französisch A1.1 (Seminar, 2 SWS)

Bartanus J, Kirchhoff A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0502: French A1.2 | Französisch A1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

- gesicherte Kenntnisse der Stufe A1.1
- Einstufungstest mit Ergebnis A1.2

#### Content:

In diesem Modul werden die Grundkenntnisse in französischer Lexik und Grammatik für einfache, mündliche und schriftliche Kommunikationssituationen im Alltag erweitert. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Der/Die Studierende lernt z.B., einfache Fragen zu Person und Familie zu stellen und zu beantworten, Verabredungen zu treffen, Reservierungen von Hotel zu tätigen, über Freizeit und Ferien zu berichten, vergangene Erlebnisse zu erzählen. Es werden u.a. folgende grammatische Themen behandelt: Passé Composé, Futur proche, Mengenangaben, Possessivbegleiter, direkte und indirekte Objektpronomen.

Es werden Strategien vermittelt, die eine Verständigung trotz noch geringer Sprachkenntnisse in alltäglichen Grundsituationen ermöglichen. Außerdem werden Möglichkeiten aufgezeigt,

den Lernprozess in der Fremdsprache effektiver zu gestalten und die eigene Lernfähigkeit zu verbessern.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau „A1 – Elementare Sprachverwendung“ des GER. Der/ Die Studierende ist nach Abschluss dieses Moduls in der Lage, alltägliche Ausdrücke und sehr einfache Sätze zu verstehen und zu verwenden. Er/sie kann sich auf einfache Art verständigen, wenn die Gesprächspartnerinnen oder Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen. Er/sie kann einfache schriftliche Mitteilungen zur Person machen. Sowohl im mündlichen als auch im schriftlichen Sprachgebrauch ist der/die Studierende in der Lage, situationsadäquat, bzw. der A 1-Stufe entsprechend, Wortschatz und Grammatik korrekt anzuwenden.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

**Reading List:**

Lehrbuch (wird im Unterricht bekanntgegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Französisch A1.2 (Seminar, 2 SWS)

Bartanus J, Delavigne C, Kirchhoff A, Perconte-Duplain S

Blockkurs Französisch A1.2 (Seminar, 2 SWS)

Bruel J, Delavigne C

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0503: French A2.1 | Französisch A2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

- gesicherte Kenntnisse der Stufe A1
- Einstufungstest mit Ergebnis A2.1

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Französisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden, z.B. auf Reisen, beim Arzt, bei der Wohnungssuche, unter Kollegen, Freunden und Nachbarn. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Die grammatischen Strukturen werden weiter aufgebaut. Folgende grammatischen Themen werden behandelt, wie z.B. Verwendung von Passé Composé und Imparfait, Konditional, Relativpronomen, „en + y“ Pronomen, Komparativ und Superlativ.

Es werden Strategien vermittelt, die mündlich wie schriftlich eine Verständigung trotz noch geringer Sprachkenntnisse ermöglichen. Außerdem werden Möglichkeiten aufgezeigt, den Lernprozess effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern. Ferner

werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern.

**Intended Learning Outcomes:**

Das Modul orientiert sich am „A2 – Elementare Sprachverwendung“ des GER. Nach Abschluss dieses Moduls kann der/die Studierende einfache Sätze und Redewendungen zu einem erweiterten Spektrum an vertrauten Themen verstehen und gebrauchen. Er/Sie kann beispielsweise sich und andere Personen, persönliche Wohnsituation, Gesundheitszustand, Freizeitverhalten beschreiben. Er/Sie ist in der Lage, sich bei der Wohnungssuche und in wesentlichen Situationen im Urlaub oder auf (Geschäfts)Reisen zu verständigen und von daraus resultierenden Erfahrungen und Erlebnissen zu berichten. Er/Sie kann standardsprachliche Ausdrücke in vertrauten Kommunikationssituationen sowohl in mündlicher als auch in schriftlicher Form verstehen und verwenden und dabei Wortschatz und Grammatik korrekt anzuwenden.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch, multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

**Reading List:**

Lehrbuch (wird im Kurs bekanntgegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Französisch A2.1 (Seminar, 2 SWS)

Bartanus J, Bruel J, Paul E, Suek C

Blockkurs Französisch A2.1 (Seminar, 2 SWS)

Paul E



For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0504: French A2.2 | Französisch A2.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

- gesicherte Kenntnisse der Stufe A2.1
- Einstufungstest mit Ergebnis A2.2

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Französisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Das Hör- und Leseverstehen sowie das Sprechen werden anhand verschiedener Hörübungen und Texten aus verschiedenen Bereichen des Alltagslebens und der Arbeitswelt trainiert. Die Wiederholung und Vertiefung der Grammatik orientiert sich an den kommunikativen Lernzielen. Es werden u.a. folgende grammatische Themen behandelt: Zukunft, Gerundium, indirekte Rede, Vergangenheitszeiten, Angleichung des Partizips, Subjonctif. Es werden Strategien vermittelt, die mündlich wie schriftlich eine Verständigung trotz noch geringer Sprachkenntnisse ermöglichen. Außerdem werden Möglichkeiten aufgezeigt, den Lernprozess effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau „A2 – Elementare Sprachverwendung“ des GER. Nach Abschluss dieses Moduls kann der/die Studierende im Gespräch einfache Sätze und Redewendungen zu einem erweiterten Spektrum an vertrauten Themen verstehen und gebrauchen. Dabei handelt es sich um grundlegende Informationen zu alltäglichen, oder studien- bzw. berufsrelevanten Themen unter Einbeziehung landeskundlicher Aspekte. Der/die Studierende kann Texte und Briefe zu vertrauten Themen verstehen, in denen gängige aber einfache alltags- oder berufsbezogene Sprache verwendet wird und in denen vorhersehbare Informationen zu finden sind. Er/Sie ist in der Lage kurze, informative Texte oder Mitteilungen zu grundlegenden Situationen in Alltag und Studium zu verfassen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch, multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

**Reading List:**

Lehrbuch (wird im Kurs bekanntgegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Französisch A2.2 (Seminar, 2 SWS)

Bruel J, Comte-Maillard C, Paul E, Suek C

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0505: French B1.1 | Französisch B1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

- gesicherte Kenntnisse der Stufe A2
- Einstufungstest mit Ergebnis B1.1

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Französisch erarbeitet, die es den Studierenden ermöglichen, (sich) in vertrauten Situationen, z.B. im Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse selbständig und sicher in der Zielsprache zu operieren/bewegen/verständigen, wenn Standardsprache verwendet wird. Dabei werden interkulturelle, landeskundliche und studienbezogene Aspekte berücksichtigt.

Die Studierenden vertiefen Ihre Kenntnisse anhand verschiedenster aktueller Themen des französischen Lebens. Sie erweitern Ihren Wortschatz sowie festigen und vertiefen die bisher erlernten grammatischen Schwerpunkte der französischen Sprache.

### **Intended Learning Outcomes:**

Dieses Modul orientiert sich an Niveau "B 1- Selbständige Sprachverwendung" des GER. Der/die Studierende kann sich in den ihm/ihr vertrauten Situationen, denen man in Studium oder Beruf, Freizeit und auf Reisen im Sprachgebiet begegnet, sicher verständigen.

Er/sie kann wesentliche Inhalte in einfachen authentischen Texten aus alltäglichen Bereichen verstehen und sich an Gesprächen zu vertrauten Themen beteiligen. Er/sie ist in der Lage, persönliche Erfahrungen und Eindrücke schriftlich in eine längere Stellungnahme zum Ausdruck zu bringen.

Sowohl im mündlichen als auch im schriftlichen Sprachgebrauch ist der/die Studierende in der Lage, situationsadäquat, bzw. der B 1-Stufe entsprechend, Wortschatz und Grammatik korrekt anzuwenden.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

### **Reading List:**

Lehrbuch (wird im Kurs bekanntgegeben)

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Französisch B1.1 (Seminar, 2 SWS)

Bartanus J, Perconte-Duplain S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ05061: French B1.2 | Französisch B1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

- gesicherte Kenntnisse der Stufe B1.1
- Einstufungstest mit Ergebnis B1.2

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Französisch erarbeitet, die es den Studierenden ermöglichen, (sich) in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse wie Film, Musik, Sport u.a. selbständig und sicher in der Zielsprache zu operieren/bewegen/verständigen, wenn Standardsprache verwendet wird. Die Studierenden vertiefen Ihre Kenntnisse anhand verschiedenster aktueller Themen des französischen Lebens. Sie erweitern Ihren Wortschatz sowie festigen und vertiefen die bisher erlernten grammatischen Schwerpunkte der französischen Sprache.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1 des GER. Der/Die Studierende erlangt Kenntnisse in der Fremdsprache Französisch auf standardsprachlichem Niveau unter Berücksichtigung interkultureller, landeskundlicher, und studienbezogener Aspekte.

Nach Abschluss des Moduls kann der/die Studierende sich in den meisten Situationen, denen man in Studium oder Beruf, Freizeit und auf Reisen im Sprachgebiet begegnet, sicher verständigen. Er/Sie kann wesentliche Inhalte in einfachen, authentischen Sachtexten, Fernseh- oder Radiosendungen und literarischen Texten verstehen und wiedergeben und sich spontan an Gesprächen zu vertrauten Themen von allgemeinem Interesse beteiligen. Er kann einfache formelle und längere persönliche Briefe und Texte verfassen, strukturiert zu einem alltäglichen Thema von persönlichem Interesse referieren und schriftlich eine logisch begründete Stellungnahme zu einem aktuellen Thema verfassen, wenn Hilfestellung gegeben wird.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

### **Reading List:**

Lehrbuch (wird im Kurs bekanntgegeben)

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Französisch B1.2 (Seminar, 2 SWS)

Comte-Maillard C, Roubille A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0514: French B2 - Communication Course | Französisch B2 - Cours de conversation

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Kumulative Tests: 80%

Präsentation: 20%

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21). Zu der Prüfungsleistung gehört auch eine kurze Präsentation auf Französisch zu einem kulturbezogenen, gesellschaftlichen oder wissenschaftlichen Thema im Zusammenhang mit Frankreich oder dem französischen Sprachraum. Diese Präsentation ist eigenverantwortlich mündlich wie schriftlich zu gestalten bzw. vorzutragen. Anschließend sollen auch Fragen zur eigenen Präsentation beantwortet werden können.

#### Repeat Examination:

#### (Recommended) Prerequisites:

- gesicherte Kenntnisse der Stufe B1
- Einstufungstest mit Ergebnis B2

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Französisch aufgebaut und vertieft, die es den Studierenden ermöglichen, aktiv und mit einem gewissen Grad an Flüssigkeit über



Themen von allgemeinem Interesse oder von vertrautem Fachgebiet mit einem Muttersprachler zu diskutieren und eine Argumentation gut verständlich ausführen.

Ein besonderes Merkmal wird in diesem Modul auf die Entwicklung von Lesestrategien von allgemeinen und fachbezogenen Texten, auf Wortschatzarbeit und die Entwicklung von Hörstrategien gelegt. Zur Festigung der mündlichen und schriftlichen Fertigkeit werden Schwerpunkte der Grammatik wiederholt und vertieft.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau „B2- Selbständige Sprachverwendung“ des GER. Der/die Studierende kann den wesentlichen Inhalt von Artikeln und Berichten sowie Texte aus dem eigenen Fach- und Interessengebiet selbständig verstehen.

Er/sie kann längere Redebeiträge und Vorträge zu aktuellen Themen folgen, sofern sie klar vorgetragen werden.

Er/sie ist in der Lage Texte zu aktuellen Themen zu schreiben und dabei auch zu einem gewissen Grad komplexe Satzstrukturen zu benutzen.

Er/sie kann zu vielen Themen aus seinen/ihren Interessen- oder Fachgebieten klar in mündlicher Form kommunizieren.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

**Reading List:**

Lehrbuch (wird im Kurs bekanntgegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0515: French C1 - Upper Conversation Course | Französisch C1 - Cours de conversation supérieure

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Kumulative Tests: 60%

Präsentation: 20%

Hausarbeit: 20%

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21). Zu der Prüfungsleistung gehört auch eine kurze Präsentation auf Französisch zu einem kulturbezogenen, gesellschaftlichen oder wissenschaftlichen Thema im Zusammenhang mit Frankreich oder dem französischen Sprachraum. Diese Präsentation ist eigenverantwortlich mündlich wie schriftlich zu gestalten bzw. vorzutragen. Anschließend sollen auch Fragen zur eigenen Präsentation beantwortet werden können. Die Hausarbeit (Form, Umfang und Thema) wird am Anfang des Semesters genau mit den Studierenden abgesprochen.

#### Repeat Examination:

#### (Recommended) Prerequisites:

- gesicherte Kenntnisse der Stufe B2
- Einstufungstest mit Ergebnis C1

**Content:**

In diesem Modul werden Kenntnisse in der Fremdsprache Französisch erarbeitet, die es den Studierenden ermöglichen, mündlich wie schriftlich in Themenbereichen aus Alltag, Beruf und Kultur situationsadäquat zu handeln (agieren und reagieren). Anhand von Literatur, aktuellen Presseartikeln, Radio- und Fernsehausschnitten werden soziokulturelle Zusammenhänge aktueller Themen reflektiert. Auf individuelle Themenvorschläge wird gerne eingegangen. Es werden Kenntnisse in den benannten Bereichen vertieft und Aspekte der Grammatik wiederholt und ergänzt.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich an Niveau "C1-Kompetente Sprachverwendung" des GER. Nach der Teilnahme an der Lehrveranstaltung kann der/die Studierende auf sehr hohem Niveau in unterschiedlichsten Situationen mündlich und schriftlich kommunizieren. Er/Sie ist in der Lage, die Fremdsprache mündlich und schriftlich sowohl im Auslandsstudium als auch im Beruf wirksam und flexibel zu gebrauchen. Er/Sie kann ein breites Spektrum anspruchsvoller, längerer Texte verstehen und auch implizite Bedeutungen erfassen. Er/Sie kann sich spontan und fließend ausdrücken, ohne öfter deutlich erkennbar nach Worten suchen zu müssen. Er/Sie kann sich klar, strukturiert und ausführlich zu komplexen Sachverhalten äußern und dabei verschiedene Mittel zur Textverknüpfung angemessen verwenden.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Presseartikel, multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

**Reading List:**

wird in der Lehrveranstaltung bekannt gegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Französisch C1 - Cours de conversation supérieure (Seminar, 2 SWS)

Perconte-Duplain S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0523: French C1 - French in Business | Französisch C1 - Le français des affaires

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

- kumulative Tests (70%)
- Präsentation (30%)

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Text- bzw. Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten kumulativen Prüfungsaufgaben abgehalten. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21). Zu der Prüfungsleistung gehört eine kurze Präsentation auf Französisch zu einem politischen oder wirtschaftlichen Thema im Zusammenhang mit Frankreich oder dem französischen Sprachraum. Diese Präsentation ist eigenverantwortlich mündlich wie schriftlich zu gestalten bzw. vorzutragen. Anschließend sollen auch Fragen zur eigenen Präsentation beantwortet werden können.

#### Repeat Examination:

#### (Recommended) Prerequisites:

- gesicherte Kenntnisse der Stufe B2
- Einstufungstest mit Ergebnis C1
- Vorkenntnisse in BWL und/oder VWL sind keineswegs erforderlich.

#### Content:

In dieser LV werden Kenntnisse in der Fremdsprache Französisch aufgebaut und vertieft, die es den Studierenden ermöglichen, spontan und fließend über Themen von politischen, wirtschaftlichen oder gesellschaftlichen Interesse mit einem Muttersprachler zu diskutieren und

eine Meinung strukturiert und überzeugend zu vertreten, ohne öfter deutlich erkennbar nach Worten suchen zu müssen.

Die LV gibt einerseits eine Einleitung in das Französisch des Wirtschaftslebens und bereitet andererseits die Studierenden auf einen (Studien-)Aufenthalt im frankophonen Sprachraum vor. Besonderes Augenmerk wird auf die Entwicklung kommunikativer Fähigkeiten und interkultureller Kompetenz gelegt. Zur Festigung der mündlichen und schriftlichen Fertigkeit werden bei Bedarf Schwerpunkte der Grammatik wiederholt und vertieft.

In dieser LV bilden ausgewählte volkswirtschaftliche Themen (Konsum, Rolle des Staates, diverse betriebliche Funktionen, Globalisierung, Nachhaltigkeit u. a.) eine zentrale Rolle.

### **Intended Learning Outcomes:**

Die LV orientiert sich am Niveau C 1 Fachkundige Sprachkenntnisse des GER. Der/die Studierende ist in der Lage, durch relevantes interkulturelles Wissen über Berufs- und Wirtschaftswelt im französischen Sprachraum angemessen zu kommunizieren und einen Studienaufenthalt, ein Praktikum oder Weiterbildungsmaßnahmen im französischen Sprachraum anzustreben.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Französisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

Moderierte Diskussionen.

### **Media:**

Presseartikel, multimedial gestütztes Lehr- und Lernmaterial (Tafel, Folie, Übungsblätter, Bild, Film, etc.), auch online.

### **Reading List:**

wird in der Lehrveranstaltung bekannt gegeben

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ0601: Italian A1.1 + A1.2 - Intensive | Italienisch A1.1 + A1.2 - Intensiv

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Italienisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Situationen zurechtzufinden, wie z.B. sich und andere vorstellen, Auskünfte über sich selbst geben und Auskünfte über den Gesprächspartner erfragen, Weginformationen erfragen und geben, über vergangene Aktivitäten und Ereignisse kurz berichten etc.

Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.

Die Studierenden werden in die italienische Phonetik eingeführt; sie erlernen grundlegendes Vokabular zu Themen wie Studium/Beruf, Freizeit, Tagesablauf. Es werden u. a. folgende grammatische Kapitel gelernt und geübt: Bestimmte und unbestimmte Artikel, Nomen- und Adjektivdeklination, Präpositionen, Präsens regelmäßiger und unregelmäßiger Verben, Passato prossimo, direkte und indirekte Objektpronomen.

Außerdem werden Möglichkeiten aufgezeigt, wie man den Lernprozess in der Fremdsprache eigenverantwortlich und effektiv gestalten kann.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 – Elementare Sprachverwendung des Gemeinsamen Europäischen Referenzrahmens für Sprachen.

Die Studierenden erlangen Grundkenntnisse in der Fremdsprache Italienisch mit allgemeinsprachlicher Orientierung unter Berücksichtigung interkultureller und landeskundlicher Aspekte.

Nach Abschluss des Moduls sind die Studierenden in der Lage, sehr einfache Ausdrücke und Sätze zu verwenden, die auf die Befriedigung konkreter Bedürfnisse des alltäglichen Bedarfs zielen. Sie können

persönliche Auskünfte über sich geben sowie persönliche Auskünfte über den Gesprächspartner erfragen, in einfacher Weise Tagesabläufe beschreiben und schriftliche Mitteilungen zur Person machen, Vorlieben nennen, Verabredungen treffen. Zudem können sie in einfach strukturierten Sätzen von vergangenen Ereignissen und Aktivitäten erzählen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien. Freiwillige Hausaufgaben zur Vor- und Nachbereitung festigen das Gelernte.

**Media:**

Lehrwerk; multimedial gestütztes Lehr- und Lernmaterial.

**Reading List:**

Lehrwerk (wird im Unterricht bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Italienisch A1.1+A1.2 - Intensiv (Seminar, 4 SWS)

Aquaro M, Mainardi D, Soares da Silva D

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0602: Italian A1.1 | Italienisch A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).)

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Italienisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen trotz geringer Sprachkenntnisse zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.

Die Studierenden werden in die italienische Phonetik eingeführt; sie lernen und üben den Grundwortschatz; sie lernen und üben einfache Fragen zur Person zu stellen und zu beantworten, Interessen auszudrücken, Wünsche zu nennen, über die eigenen Gewohnheiten kurz zu berichten und Formulare auszufüllen. Es werden dabei grammatische Themen wie z.B. Präsensformen regelmäßiger und einiger unregelmäßiger Verben, Personalpronomen, bestimmte, unbestimmte Artikel, Fragesätze, Angleichung der Adjektive behandelt.

Außerdem werden Möglichkeiten aufgezeigt, wie man den Lernprozess in der Fremdsprache Italienisch eigenverantwortlich und effektiv gestalten kann.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 – Elementare Sprachverwendung des Gemeinsamen Europäischen Referenzrahmens für Sprachen.

Nach Abschluss des Moduls sind die Studierenden in der Lage, sich auf sehr einfache Art in der Fremdsprache Italienisch zu verständigen, wenn die Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen. Sie können einfache Ausdrücke und Sätze verwenden, die auf die Befriedigung konkreter Bedürfnisse des alltäglichen Bedarfs zielen wie z. B. sich und andere vorstellen, Auskünfte über sich selbst geben und Auskünfte über die anderen erfragen, Wünsche äußern, über Tagesablauf und Vorlieben sprechen bzw. schreiben.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien. Freiwillige Hausaufgaben zur Vor- und Nachbereitung festigen das Gelernte.

**Media:**

Lehrwerk; multimedial gestütztes Lehr- und Lernmaterial.

**Reading List:**

Lehrwerk (wird im Unterricht bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Italienisch A1.1 (Seminar, 2 SWS)

Alfieri L, Aquaro M, Bonomini F, Mainardi D, Schmidt C, Taddia E, Togni M, Villadei M

Blockkurs Italienisch A1.1 (Seminar, 2 SWS)

Aquaro M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0602: Italian A1.1 | Italienisch A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).)

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Italienisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen trotz geringer Sprachkenntnisse zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.

Die Studierenden werden in die italienische Phonetik eingeführt; sie lernen und üben den Grundwortschatz; sie lernen und üben einfache Fragen zur Person zu stellen und zu beantworten, Interessen auszudrücken, Wünsche zu nennen, über die eigenen Gewohnheiten kurz zu berichten und Formulare auszufüllen. Es werden dabei grammatische Themen wie z.B. Präsensformen regelmäßiger und einiger unregelmäßiger Verben, Personalpronomen, bestimmte, unbestimmte Artikel, Fragesätze, Angleichung der Adjektive behandelt.

Außerdem werden Möglichkeiten aufgezeigt, wie man den Lernprozess in der Fremdsprache Italienisch eigenverantwortlich und effektiv gestalten kann.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 – Elementare Sprachverwendung des Gemeinsamen Europäischen Referenzrahmens für Sprachen.

Nach Abschluss des Moduls sind die Studierenden in der Lage, sich auf sehr einfache Art in der Fremdsprache Italienisch zu verständigen, wenn die Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen. Sie können einfache Ausdrücke und Sätze verwenden, die auf die Befriedigung konkreter Bedürfnisse des alltäglichen Bedarfs zielen wie z. B. sich und andere vorstellen, Auskünfte über sich selbst geben und Auskünfte über die anderen erfragen, Wünsche äußern, über Tagesablauf und Vorlieben sprechen bzw. schreiben.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien. Freiwillige Hausaufgaben zur Vor- und Nachbereitung festigen das Gelernte.

**Media:**

Lehrwerk; multimedial gestütztes Lehr- und Lernmaterial.

**Reading List:**

Lehrwerk (wird im Unterricht bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Italienisch A1.1 (Seminar, 2 SWS)

Alfieri L, Aquaro M, Bonomini F, Mainardi D, Schmidt C, Taddia E, Togni M, Villadei M

Blockkurs Italienisch A1.1 (Seminar, 2 SWS)

Aquaro M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0605: Italian A1.2 | Italienisch A1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse des Moduls A1.1 (bestandene Klausur) oder Einstufungstest mit Ergebnis A1.2

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Italienisch unter Berücksichtigung landeskundlicher und interkultureller Aspekte weitervermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen trotz geringer Sprachkenntnisse zurechtzufinden.

Der/Die Studierende lernt bzw. erweitert grundlegendes Vokabular zu vertrauten Themen wie Alltag und Freizeit, Studium und Studentenleben, Stadt und öffentlicher Verkehr.

Er/sie lernt u.a. über sich selbst und über die eigenen Gewohnheiten im Alltag zu berichten; auf der Straße um Auskunft zu bitten und darauf zu reagieren; einen Weg zu beschreiben; Verabredungen zu treffen; von vergangenen Erlebnissen und Erfahrungen zu erzählen. Es werden u.a. folgende grammatische Themen behandelt: Direkte und indirekte Objektpronomen, Präpositionen mit und ohne Artikel, Passato prossimo. Die italienische Phonetik wird weitergelernt und geübt.

Außerdem werden Möglichkeiten aufgezeigt, wie man den Lernprozess in der Fremdsprache eigenverantwortlich und effektiv gestalten kann.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 – Elementare Sprachverwendung - des Gemeinsamen Europäischen Referenzrahmens für Sprachen.

Nach Abschluss des Moduls ist der/die Studierende in der Lage, sich auf sehr einfache Art in der Fremdsprache Italienisch zu verständigen, wenn die Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen. Er/sie kann den Grundwortschatz zu Themen wie Alltag und Freizeit, Universität, Stadt und öffentlicher Verkehr verstehen und in sehr einfach strukturierten Sätzen verwenden. Außerdem kann er/sie über sich selbst, die eigenen Gewohnheiten und Vorlieben kurz berichten; auf der Straße um Auskunft bitten und darauf reagieren; Verabredungen treffen; von Erfahrungen in der Vergangenheit in sehr elementarer Form erzählen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien. Freiwillige Hausaufgaben zur Vor- und Nachbereitung festigen das Gelernte.

**Media:**

Lehrwerk; multimedial gestütztes Lehr- und Lernmaterial.

**Reading List:**

Lehrwerk (wird im Unterricht bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Italienisch A1.2 (Seminar, 2 SWS)

Alfieri L, Bonomini F, Mainardi D, Togni M, Villadei M

Blockkurs Italienisch A1.2 (Seminar, 2 SWS)

Taddia E

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ06091: Italian B1.2 | Italienisch B1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse des Moduls B1.1 (bestandene Klausur) oder Einstufungstest mit Ergebnis B1.2

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Italienisch erarbeitet, die es den Studierenden ermöglichen, sich in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse wie Aktualität, Gesellschaft, Film, Musik selbständiger und sicherer in der Zielsprache zu verständigen, wenn Standardsprache verwendet wird. Dabei werden landeskundliche und interkulturelle Aspekte berücksichtigt. Die Studierenden lernen/üben u.a. Personen, Orte, Situationen präziser in mündlicher und schriftlicher Form zu beschreiben und zu vergleichen; Zweifel, Vorbehalt, Gegenmeinung zu äußern; Pläne, Ziele sowie persönliche Ansichten zu formulieren. Dazu werden entsprechende, hierfür notwendige grammatische Themen bzw. Wortschatz behandelt, gefestigt und vertieft. Außerdem werden Möglichkeiten aufgezeigt, wie man den Lernprozess in der Fremdsprache Italienisch eigenverantwortlich und effektiv gestalten kann.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1, „Selbständige Sprachverwendung“, des Gemeinsamen Europäischen Referenzrahmens für Sprachen.

Nach Abschluss des Moduls können die Studierenden die meisten Situationen bewältigen, denen man im Sprachgebiet begegnet. Sie können ohne Vorbereitung an Gesprächen über Themen teilnehmen, die ihnen vertraut sind, die sie persönlich interessieren oder die sich auf Themen des Alltags wie Familie, Hobbys, Studium/Beruf, Film, Musik, aktuelle Ereignisse beziehen. Sie sind in der Lage, mündlich wie schriftlich über Erfahrungen und Ereignisse einfach und zusammenhängend zu berichten; Personen, Orte und Situationen genau zu beschreiben und zu vergleichen; Eindrücke, Gefühle sowie Ziele und Wünsche zu formulieren; den eigenen Standpunkt zu vertreten. Beim Hören von Beiträgen über aktuelle Ereignisse und über Themen aus eigenem Studium- oder Interessensgebiet können sie die Hauptinformationen verstehen. Beim Lesen können sie wesentliche Inhalte in längeren und authentischen Sachtexten wie Zeitungsartikeln oder Auszügen aus der zeitgenössischen italienischen Literatur aufnehmen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren; moderierte Diskussionen.

Freiwillige Hausaufgaben zur Vor- und Nachbereitung festigen das Gelernte.

**Media:**

Lehrwerk; multimedial gestütztes Lehr- und Lernmaterial.

**Reading List:**

Lehrwerk (wird im Unterricht bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Italienisch B1.2 (Seminar, 2 SWS)

Schmidt C

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0630: Italian B1/B2 Conversation | Italienisch B1/B2 - Corso di conversazione

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21)..

#### Repeat Examination:

#### (Recommended) Prerequisites:

Fundierte Kenntnisse des Moduls B1.1 (bestandene Klausur) oder Einstufungstest mit Ergebnis B1.2

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Italienisch vermittelt/aufgebaut und vertieft, die es den Studierenden ermöglichen, aktiv und mit einem gewissen Grad an Flüssigkeit über Themen von allgemeinem Interesse oder von vertrautem Fachgebiet mit einem Muttersprachler zu diskutieren und eine Argumentation gut verständlich auszuführen. Dabei werden landeskundliche und interkulturelle Aspekte berücksichtigt. Presseartikeln, Filme, Radio- und Fernsehsendungen sowie Blogs und Beiträgen aus den sozialen Netzwerken bilden die Grundlage für den interaktiven Unterricht. Der/die Studierende lernt die bisher erworbenen Sprachkenntnisse durch eine intensive Kommunikationspraxis zu aktivieren bzw. auszubauen. Er/sie verbessert die eigene mündliche Ausdrucksfähigkeit, indem er/sie differenzierteren Wortschatz und Idiomatik in verschiedenen Gesprächssituationen erarbeitet. Typische sprachliche Interaktionsstrategien wie z.B. Sprecherwechsel, Rückfragen stellen,

um Klärung bitten, auf Einwände und schwierige Fragen reagieren, werden durch gezielte Übungssequenzen trainiert. Je nach Bedarf werden Schwerpunkte der Grammatik wiederholt und vertieft.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1/B2, „Selbständige Sprachverwendung“, des Gemeinsamen Europäischen Referenzrahmens für Sprachen.

Nach Abschluss des Moduls ist der/die Studierende in der Lage, mündliche Beiträge oder schriftliche Texte zu aktuellen und kulturellen Themen aus italienischen Medien zu verstehen, sie zusammenzufassen und darüber zu berichten. Außerdem kann er/sie zu diesen Themen eine persönliche Meinung äußern und widersprechen bzw. für und gegen etwas argumentieren. Er/sie kann in einer Diskussion über allgemeine und aktuelle Themen wie z.B. Film, Musik, Umwelt, Politik adäquat interagieren.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren; moderierte Diskussionen.

Freiwillige Hausaufgaben zur Vor- und Nachbereitung festigen das Gelernte.

**Media:**

multimedial gestütztes Lehr- und Lernmaterial.

**Reading List:**

wird im Unterricht bekannt gegeben

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1304: Hebrew A1.1 | Hebräisch A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

Der/die Studierende erlangt Grundkenntnisse in der Fremdsprache Hebräisch mit alltagspraktischer Orientierung unter Berücksichtigung kultureller und landeskundlicher Aspekte. Es werden Kenntnisse vermittelt, die es den Studierenden ermöglichen, sehr einfache Strukturen wiederzugeben.

Themen aus alltäglichen Situationen zusammen mit der entsprechenden Grammatik und Wortschatz werden behandelt.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1.1 des GER. Nach Abschluss dieses Moduls sind die Studierenden in der Lage die hebräischen Schriftzeichen selbstständig zu lesen, zu schreiben und auszusprechen, hebräische Druck und Schreibschrift zu beherrschen, sehr einfache Fragen zu vorgegebenen, alltäglichen Themen zu beantworten, sehr einfache vorgegebene Sätze zu erkennen und wiederzugeben.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-Partner- und Gruppenarbeit; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen. Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Hebräisch A1.1 (Seminar, 2 SWS)

Weidemann T

Hebräisch A1.1 (Seminar, 2 SWS)

Weidemann T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1305: Hebrew A1.2 | Hebräisch A1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Erfolgreich bestandene Stufe A1.1

#### Content:

In diesem Modul werden weitere Grundkenntnisse in der Fremdsprache Hebräisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. U.a. werden die Themen, Uhrzeit, feminine Zahlen, Adjektivflexion, und -verwendung, Verwendung des direkten Objekts und die Wochentage behandelt.

#### Intended Learning Outcomes:

Das Modul orientiert sich am Niveau A1.2 des GER. Nach Abschluss sind die Studierenden in der Lage, sich in sehr einfachen, routinemäßigen Situationen zu verständigen, wenn es um einen direkten Austausch von Informationen und um vertraute Themen und Tätigkeiten geht, ein sehr kurzes Kontaktgespräch zu führen (Begrüßung, Wohlbefinden, Uhrzeit erfragen und angeben, Einkäufe tätigen, nach dem Weg fragen) und mit kurzen Sätzen und einfachen Mitteln z.B. Familie, Wohnsituation, Orte und Gegenstände zu beschreiben.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-Partner- und Gruppenarbeit; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen. Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Hebräisch A1.2 (Seminar, 2 SWS)

Weidemann T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ0705: Japanese A1.1 | Japanisch A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhaltet Aufgaben zur Anwendung von Schriftzeichen, Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten (Portfolio-)Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Den Teilnehmern wird empfohlen, sich vor Kursbeginn mit der Hiragana-Silbenschrift vertraut zu machen. Hierfür werden Unterlagen im jeweiligen Moodle-Kurs bereitgestellt.

#### Content:

In dieser LV werden neben der Einübung des japanischen Schrift- und Lautsystems (v.a. Hiragana) Grundkenntnisse des Japanischen vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen trotz geringer Sprachkenntnisse zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Um dieses Ziel zu erreichen, wird Kommunikation im Kontext folgender Situationen eingeübt: sich vorstellen; einkaufen gehen; Öffnungszeiten/Telefonnummer erfragen etc. Dazu werden u.a. folgende Themen der Grammatik behandelt: Nominalaussage und Partikeln, Demonstrativpronomen, Zahlen und Zeitangaben. Die Studierenden lernen, mit dem grundlegenden Vokabular zu Themen wie Familie, Beruf, Freizeit und Wohnen einfach strukturierte Hauptsätze zu formulieren und Alltägliches zu berichten/erfragen.

**Intended Learning Outcomes:**

Nach Abschluss dieses Moduls sind die Studierenden in der Lage, vertraute, alltägliche Ausdrücke und sehr einfache Sätze zu verstehen und zu verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen. Der/die Studierende kann sich und andere vorstellen und anderen Leuten Fragen zu ihrer Person stellen, bzw. Fragen dieser Art beantworten. Er/Sie kann die japanischen Silbenschriften Hiragana selbstständig lesen, schreiben und aussprechen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens. Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben)

Vom Kursleiter selbst angefertigte/zusammengestellte Arbeitsblätter und (online-)Materialien.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Japanisch A1.1 (Seminar, 2 SWS)

Bauer K, Gottschalk H, Murakami N

Japanisch A1.1 (Seminar, 2 SWS)

Gottschalk H, Ishikawa-Vetter M, Miyayama-Sinz M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ07052: Japanese A1.1 + A1.2 | Japanisch A1.1 + A1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhaltet Aufgaben zur Anwendung von Schriftzeichen, Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten (Portfolio-)Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Den Teilnehmern wird empfohlen, sich vor Kursbeginn mit der Hiragana-Silbenschrift vertraut zu machen. Hierfür werden Unterlagen im jeweiligen Moodle-Kurs bereitgestellt.

#### Content:

In dieser LV werden neben der Einübung des japanischen Schrift- und Lautsystems (Hiragana, Katakana und elementare Kanji) Grundkenntnisse des Japanischen vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen trotz geringer Sprachkenntnisse zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Um dieses Ziel zu erreichen, wird Kommunikation im Kontext folgender Situationen eingeübt: sich vorstellen; einkaufen gehen; Einladungen aussprechen und annehmen/ablehnen etc. Dazu werden u.a. folgende Themen der Grammatik behandelt: Verben und Partikeln, Zahlen und Zeitangaben, zwei Arten von Adjektiven (i-Adjektiv u. na-adjektiv) und Existenzverben. Die Studierenden lernen, mit dem grundlegenden Vokabular zu Themen wie Familie, Beruf, Freizeit und Wohnen einfach strukturierte Hauptsätze zu formulieren und Alltägliches zu berichten/erfragen.

**Intended Learning Outcomes:**

Nach Abschluss dieses Moduls sind die Studierenden in der Lage, vertraute, alltägliche Ausdrücke und sehr einfache Sätze zu verstehen und zu verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen. Der/die Studierende kann sich und andere vorstellen und anderen Leuten Fragen zu ihrer Person stellen, bzw. Fragen dieser Art beantworten. Außerdem kann er/sie neben den japanischen Silbenschriften Hiragana und Katakana ca. 20 für den Alltag relevante Kanji (chinesische Schriftzeichen) verstehen und verwenden.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens. Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben)

Vom Kursleiter selbst angefertigte/zusammengestellte Arbeitsblätter und (online-)Materialien.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Japanisch A1.1 + A1.2 (Seminar, 4 SWS)

Bauer K, Ishikawa-Vetter M, Murakami N

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0709: Japanese A1.4 | Japanisch A1.4

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhaltet Aufgaben zur Anwendung von Schriftzeichen, Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion und wird in Form von kompetenz- und handlungsorientierten (Portfolio-)Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Erfolgreiche Teilnahme an der Stufe A 1.3 oder vergleichbare Kenntnisse

#### Content:

In dieser LV werden die Grundkenntnisse des Japanischen erweitert, die es den Studierenden ermöglichen, sich in alltäglichen Situationen mit Basissprachkenntnissen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Das Erlernen der Schriftzeichen (Kanji) ist ebenfalls grundlegend. Um dieses Ziel zu erreichen, wird Kommunikation im Kontext folgender Situationen eingeübt: in der Bank; beim Arzt; Gespräche unter Freunden etc. Dazu werden u.a. folgende Themen der Grammatik behandelt: Verbindung von zwei oder mehr Sätzen, nai-Form, Wörterbuchform sowie ta-Form der Verben und Dialoge im „einfachen Stil“. Die Studierenden lernen, mit dem grundlegenden Vokabular zu Themen wie Familie, Beruf, Freizeit und Wohnen einfache strukturierte Hauptsätze zu formulieren und Alltägliches zu berichten/erfragen.

**Intended Learning Outcomes:**

Nach Abschluss dieses Moduls sind die Studierenden in der Lage, vertraute, alltägliche Ausdrücke und ganz einfache Sätze zu verstehen und zu verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen. Der/die Studierende kann sich und andere vorstellen und anderen Leuten Fragen zu ihrer Person stellen, bzw. Fragen dieser Art beantworten. Er/Sie kann schriftliche Mitteilungen im „einfachen Stil“ machen. Außerdem kann er/sie neben den japanischen Silbenschriften Hiragana und Katakana ca. 100 für den Alltag relevante Kanji (chinesische Schriftzeichen) verstehen und verwenden.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; Gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens. Freiwillige Hausaufgaben (zur Vor- und Nachbearbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben)

Vom Kursleiter selbst angefertigte/zusammengestellte Arbeitsblätter, (online-) Materialien.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Japanisch A1.4 (Seminar, 2 SWS)

Abe M

Blockkurs Japanisch A1.4 (Seminar, 2 SWS)

Abe M, Taguchi-Roth Y

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1808: Korean A1.1 | Koreanisch A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Koreanisch vermittelt.  
Hangul & Vorbereitung 1 bis 4: Alphabet, Vokale + Konsonanten, Silbenstruktur + Ausspracheregeln, Wort- und Satzstruktur, Begrüßung + Vorstellung, Zahlen (1-100) nach rein koreanischem System, Zahleneinheiten, Berufsbezeichnungen, Ländernamen, Demonstrativ- und Possessivpronomina, Orte + Einrichtungen, Ortsangaben, Konjugationsformen (regelmäßige Verben).

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1.1 des GER. Nach Abschluss sind die Studierenden in der Lage vertraute, alltägliche Ausdrücke und ganz einfache Sätze zu verstehen und zu verwenden, die auf die Befriedigung konkreter Bedürfnisse zielen. Er/Sie kann sich und andere vorstellen und entsprechend Fragen formulieren. Er/Sie kann sich auf einfache Art verständigen, wenn die Gesprächspartnerinnen oder Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-Partner- und Gruppenarbeit; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen. Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Koreanisch A1.1 (Seminar, 2 SWS)

Jeong H, Kim Y, Ko E, Lee K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ1601: Dutch A1 | Niederländisch A1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Studien-/Prüfungsleistungen:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse, mündlich und schriftlich, in der Fremdsprache Niederländisch vermittelt, die den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt, die den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Die Studierenden lernen/üben: z.B. Auskunft über die Wohnsituationen zu geben, den Tagesablauf zu beschreiben,

über Gewohnheiten, Freizeit, Ausbildung und Arbeit zu sprechen und Wegbeschreibungen zu verstehen /geben.

Dazu werden u.a. folgende Themen der Grammatik behandelt und geübt: Nomen und Adjektive, Präsens, Perfekt und Präteritum, unregelmäßige Verben und Modalverben.

Es werden Strategien vermittelt, die eine Verständigung trotz noch geringer Sprachkenntnisse (in alltäglichen Grundsituationen) ermöglichen. Außerdem werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Niederländisch effektiver zu gestalten und die eigenen Lernfähigkeiten zu verbessern.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich an Niveau "A1 Elementare Sprachverwendung" des GER. Nach der Teilnahme an der Modulveranstaltung sind die Studierenden in der Lage vertraute, alltägliche Ausdrücke und sehr einfache Sätze zu verstehen und zu verwenden, die auf die Befriedigung konkreter in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen. Er/Sie kann sich und andere vorstellen und anderen Leuten Fragen zu ihrer Person stellen und auf Fragen dieser Art Antwort geben. Der/Die Studierende kann sich auf einfache Art verständigen, wenn die Gesprächspartnerinnen oder Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperatives Lernens; Kontrolliertes Selbstlernen grundlegender grammatischer Phänomene der Fremdsprache mit vorgegebenen Materialien.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Niederländisch A1 (Seminar, 2 SWS)

Becker H

Niederländisch A1 (Seminar, 2 SWS)

Becker H

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1602: Dutch A2 | Niederländisch A2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Studien-/Prüfungsleistungen:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Bestandene A1-Stufe

#### Content:

In diesem Modul werden erweiterte Grundkenntnisse, mündlich und schriftlich, der Fremdsprache Niederländisch vermittelt, die den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Die Studierenden lernen/üben: z.B. Auskunft über Gefühle und Stimmungen zu geben und Vermutungen und Meinungen zu äußern, einen formellen Brief zu schreiben, jemanden etwas zu empfehlen.

Dazu werden u.a. folgende Themen der Grammatik behandelt und geübt: den Superlativ, das Wörtchen „er“, das Futur, die Rechtschreibung und das Passiv. Es werden Strategien vermittelt, die eine Verständigung trotz noch geringer Sprachkenntnisse (in alltäglichen Grundsituationen) ermöglichen. Außerdem werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Niederländisch effektiver zu gestalten und die eigenen Lernfähigkeiten zu verbessern.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich an Niveau "A2 Elementare Sprachverwendung" des GER. Nach der Teilnahme an der Modulveranstaltung sind die Studierenden in der Lage vertraute, häufig gebrauchte Ausdrücke zu verstehen, (etwa Informationen zur Person und zur Familie, Einkaufen, Arbeit, nähere Umgebung) und sich in routinemäßigen Situationen mit dem Ziel des Informationsaustausches zu verständigen. Die eigene Herkunft und Ausbildung, direkte Umgebung und Dinge im Zusammenhang mit unmittelbaren Bedürfnissen beschreiben. Der/Die Studierende kann sich auf einfache Art verständigen, wenn die Gesprächspartnerinnen oder Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperatives Lernens; Kontrolliertes Selbstlernen grundlegender grammatischer Phänomene der Fremdsprache mit vorgegebenen Materialien.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Niederländisch A2 (Seminar, 2 SWS)

Becker H

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1701: Norwegian A1 | Norwegisch A1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Studien-/Prüfungsleistungen:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Norwegisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen trotz geringer Sprachkenntnisse zurechtzufinden. Wir lernen / üben grundlegendes Vokabular zu Themen wie Familie, Wohnen, Beruf, Freizeit, Landeskunde und in einfach strukturierten Haupt- und Nebensätzen Alltägliches im Präsens zu berichten; Plural der Nomen; Personal-, Reflexiv-, Demonstrativ- und einige Possessivpronomen; einfache Negationsformen; den Gebrauch einiger Modalverben und Präpositionen; Adjektivdeklination.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 des GER. Der/die Studierende erlangt Grundkenntnisse in der Fremdsprache Norwegisch mit allgemeinsprachlicher Orientierung unter Berücksichtigung kultureller und landeskundlicher Aspekte. Nach Abschluss dieses Moduls kann er/sie alltägliche Ausdrücke und sehr einfache Sätze verstehen und verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen. Der/die Studierende kann sich auf einfache Art verständigen, wenn die Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen.

Er/Sie kann beispielsweise einfache Fragen zu Person und Familie stellen und beantworten sowie Verabredungen treffen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-Partner- und Gruppenarbeit; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen.

Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Norwegisch A1 (Seminar, 2 SWS)

Janes J

Norwegisch A1 (Seminar, 2 SWS)

Janes J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1703: Norwegian B1 | Norwegisch B1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Bestandene Abschlussklausur A2

#### Content:

In diesem LV werden Kenntnisse der Fremdsprache Norwegisch erarbeitet, die es den Studierenden ermöglichen, sich in vertrauten Situationen und zu Themen von allgemeinem Interesse selbständig in der Zielsprache zu äußern.

Kommunikationsmöglichkeiten (Vokabular, Redewendungen, Dialogmuster etc.) zu den genannten Bereichen, ergänzen das Repertoire an Nebensätzen.

Wir wiederholen / intensivieren und ergänzen elementare Aspekte der Grammatik. Die LV orientiert sich am Niveau B1 des GER. Der/Die Studierende erlangt Kenntnisse in der Fremdsprache

Norwegisch auf standardsprachlichem Niveau unter Berücksichtigung interkultureller, landeskundlicher, und studienbezogener Aspekte.

Nach Abschluss der LV kann der/die Studierende sich in den meisten alltäglichen Situationen, denen man in Studium, Freizeit und auf Reisen im Sprachgebiet begegnet, sicher verständigen, z. B. den eigenen Werdegang vorstellen, Wünsche äußern, Ratschläge erteilen, Anweisungen erteilen, um Erlaubnis bitten, zu alltäglichen Themen eine persönliche Meinung äußern und widersprechen - für und gegen etwas argumentieren, persönliche Erfahrungen und Pläne kommunizieren.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1 des GER. Nach Abschluss dieses Moduls kann der/die Studierende wesentliche Inhalte in einfachen Sachtexten, in den Medien und in literarischen Texten verstehen und wiedergeben und sich spontan an Gesprächen zu vertrauten Themen von allgemeinem Interesse beteiligen. Er/Sie kann einfache formelle und längere persönliche Briefe und Texte verfassen, strukturiert zu einem alltäglichen Thema von persönlichem Interesse referieren und schriftlich eine logisch begründete Stellungnahme zu einem aktuellen Thema verfassen, wenn Hilfestellung gegeben wird.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-Partner- und Gruppenarbeit; kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen. Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Norwegisch B1 (Seminar, 2 SWS)

Janes J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### **SZ0815: Portuguese - Portuguese for Spanish speakers A1 + A2 | Portugiesisch - Português para hispanofalantes A1 + A2**

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### **Description of Examination Method:**

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht. Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### **Repeat Examination:**

#### **(Recommended) Prerequisites:**

Muttersprachliche Kenntnisse im Spanischen oder Spanisch als Fremdsprache auf Niveau B2.

#### **Content:**

In diesem Modul werden Grundkenntnisse in Fremdsprache Portugiesisch unter Berücksichtigung plurikultureller, plurilingualer und landeskundlicher Aspekte, die es den Studierenden ermöglichen, mit Unterstützung ihres Repertoires in anderen romanischen Sprachen, hier insbesondere Spanisch, sich in einfachen, routinemäßigen Situationen zurechtzufinden, z. B. Studium und Ausbildung, Beruf, Wohnen, Medien und Reisen, vorausgesetzt die Gesprächspartner äußern sich deutlich in den verschiedenen Varianten der portugiesischen Sprache.

Die Studierenden lernen/üben von einfachen zu komplexeren Strukturen u.a. Fragen zur Person/ zur Familie zu stellen und zu beantworten; Zahlen, Preise und Uhrzeiten zu verstehen und zu benutzen; Angabe zu einem Ort und zu Personen zu machen; Vergleiche anzustellen, über

Erfahrungen zu sprechen und sie zu bewerten, über Alltagsaktivitäten zu berichten und diese zu planen; über die Ursachen und Folgen von etwas sprechen; Anweisungen zu geben; Situationen und Ereignisse in der Vergangenheit zu schildern und erzählen; einfache Diskussionen zu führen; Meinungen zu äußern und zu begründen. Dazu werden entsprechende, hierfür notwendige grammatische Themen bzw. Wortschatz behandelt.

Es werden Strategien vermittelt, die mündlich wie schriftlich eine Verständigung trotz noch geringer Sprachkenntnisse ermöglichen. Außerdem werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern. Die Studierenden üben soziale und interkulturelle kommunikative Kompetenz durch kooperatives Handeln und Mediation (auch online).

Im Unterricht wird zugleich auf die grammatikalischen und phonetischen Unterschiede zwischen Sprachvarietäten des Portugiesisch als auch im Vergleich zum Spanischen eingegangen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich an den Niveaustufen A1 und A2 des GER.

Nach Abschluss dieses Moduls sind die Studierenden in der Lage im Gespräch einfache Sätze und Redewendungen zu einem erweiterten Spektrum an vertrauten Themen zu verstehen und zu gebrauchen. Dabei handelt es sich um grundlegende Informationen zu alltäglichen, oder studien- bzw. berufsrelevanten Themen unter Einbeziehung landeskundlicher Aspekte. Sie sind in der Lage, ihre spanischen Vorkenntnisse beim Erlernen der portugiesischen Sprache nützlich einzubringen.

Sie können beispielsweise sich und andere Personen, die persönliche Wohnsituation, Gesundheitszustand, Freizeitverhalten und berufliche Situation im Präsens oder Perfekt beschreiben. Sie können Vorschläge machen und reagieren, Informationen austauschen und Ratschläge geben.

Sie sind in der Lage, mit Hilfe feststehender Wendungen kurze, informative Texte oder Mitteilungen zu verfassen. Es werden Haupt- und Nebensätze verwendet, die durch eine Reihe von Bindewörtern kontextadäquat verbunden werden.

Die Studierenden können in Gesprächen eine unterstützende Rolle übernehmen, sofern andere Teilnehmer/innen an Gesprächen langsam sprechen und einer oder mehrere von ihnen einem dabei helfen, etwas beizutragen und Vorschläge zu machen. Sie können wichtige Informationen aus klar strukturierten, kurzen, einfachen Informationstexten übermitteln, sofern die Texte konkrete, vertraute Themen betreffen und in einfacher Alltagssprache verfasst sind.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Dadurch wird die Interaktion und Mediation mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln, unter Berücksichtigung der sozialen und interkulturellen Kompetenz. Lernautonomie und Medienkompetenz werden angestrebt.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

**Reading List:**

Lehrbuch (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0606: Italian A2.1 | Italienisch A2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Anwendung von Wortschatz und Grammatik, zu Lese- und Hörverstehen sowie zur freien Textproduktion. Hilfsmittel erlaubt. Mündliche Reaktionsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse des Moduls A1.2 (bestandene Klausur) oder Einstufungstest mit Ergebnis A2.1.

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Italienisch aufgebaut, die den Studierenden –trotz noch geringer Sprachkenntnisse- erlauben, sich in Alltagssituationen wie z. B. beim Einkaufen oder auf Reisen, in der Konversation und dem Austausch unter Kollegen, Freunden und Nachbarn zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.

Der/die Studierende lernt u.a. über vergangene Ereignisse mündlich und schriftlich zu berichten; Ratschläge und Anweisungen zu geben; kurze formelle oder informelle E-Mails zu schreiben, sich telefonisch über etwas zu erkundigen. Wortschatz und Grammatik werden weiter aufgebaut. U.a. werden grammatische Themen, wie z.B. Passato prossimo mit unregelmäßigen Partizipien; direkte Objektpronomen und „ne“ in Verbindung mit dem Passato prossimo; Bildung und Gebrauch des Adverbs; Imperativ und Stellung der Pronomen. Ferner werden Möglichkeiten und Strategien aufgezeigt, die den Lernprozess in der Fremdsprache Italienisch effektiver gestalten sollen.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A2 – „Elementare Sprachverwendung“ des Gemeinsamen Europäischen Referenzrahmens für Sprachen.

Nach Abschluss des Moduls ist der/die Studierende in der Lage, beim Hören bzw. Lesen die wichtigsten Informationen zu bekannten Themen und in routinemäßigen Situationen zu verstehen. Mündlich und schriftlich kann er/sie u.a. Ereignisse und Erlebnisse in der Vergangenheitsform in sehr einfacher Form schildern; er kann kurze formelle und informelle E-Mails verfassen sowie Informationen am Telefon erfragen; er/sie kann Ratschläge und Anweisungen geben.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren; moderierte Diskussionen.

Freiwillige Hausaufgaben zur Vor- und Nachbereitung festigen das Gelernte.

**Media:**

Lehrwerk; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrwerk (wird im Unterricht bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Italienisch A2.1 (Seminar, 2 SWS)

Mainardi D, Schmidt C, Togni M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0801: Portuguese A1 | Portugiesisch A1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht. Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in Fremdsprache Portugiesisch unter Berücksichtigung plurikultureller, plurilingualler und landeskundlicher Aspekte vermittelt, die es den Studierenden ermöglichen, sich in vertrauten und alltäglichen Grundsituationen trotz noch geringer Sprachkenntnisse zurechtzufinden.

Sie lernen/üben grundlegendes Vokabular zu Themen wie Familie, Beruf, Freizeit, Einkaufen, Wohnen, Reisen und Gesundheit, einfache Gespräche in alltäglichen Situationen zu führen und in Hauptsätzen Alltägliches in Gegenwart und Zukunft zu äußern, unter Verwendung von Nomen, Verben, Pronomen und Possessivartikeln, Modalverben und grundlegenden lokalen und temporalen Präpositionen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache eigenverantwortlich und effektiv zu gestalten. Die Studierenden üben soziale und interkulturelle kommunikative Kompetenz durch kooperatives Handeln und Mediation (auch online).

Im Unterricht wird zugleich auf die grammatikalischen und phonetischen Unterschiede zwischen Sprachvarietäten des Portugiesisch eingegangen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 des GER.

Nach Abschluss dieses Moduls sind die Studierenden in der Lage Ausdrücke und einfache Sätze zu verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen.

Sie können einfache Fragen in alltäglichen Situationen stellen und beantworten, Tagesabläufe in Präsenz beschreiben, Absichten ausdrücken und einfache schriftliche Mitteilungen zur Person machen, Verabredungen treffen und in grundlegenden alltäglichen Situationen beispielsweise beim Einkauf oder im Restaurant ihre Wünsche erfolgreich kommunizieren, sofern die Gesprächspartner langsam und deutlich sprechen und Wiederholungen anbieten, wenn es erforderlich ist.

Die Studierenden können einfache, vorhersehbare Informationen von unmittelbarem Interesse übermitteln, die in kurzen, einfachen Texten wie Schildern und Notizen, Postern und Programmen enthalten sind. Die Kommunikation kann mit Hilfe von Internationalismen und verwandten Wörtern/ Gebärden aus anderen Sprachen erfolgen.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Dadurch wird die Interaktion und Mediation mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln, unter Berücksichtigung der sozialen und interkulturellen Kompetenz. Lernautonomie und Medienkompetenz werden angestrebt.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

### **Reading List:**

Lehrbuch (wird in der LV bekannt gegeben)

### **Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Portugiesisch A1 (Seminar, 2 SWS)

de Lira Santos C, Paiva Pissarra R, Viegas Cunha R, Werkhausen R

Blockkurs Portugiesisch A1 (Seminar, 2 SWS)

Werkhausen R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ0806: Portuguese A2.1 | Portugiesisch A2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht. Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Bestandene Abschlussklausur oder gesicherte Kenntnisse der Niveau A1.

#### Content:

In diesem Modul werden Grundkenntnisse in Portugiesisch unter Berücksichtigung plurikultureller, plurilingualer und landeskundlicher Aspekte vermittelt, die es den Studierenden ermöglichen, sich einfachen, routinemäßigen Situationen zurechtzufinden, z.B. auf Reisen, beim Arzt, auf Wohnungssuche, im Kaufhaus, unter Kollegen, Freunden und Nachbarn.

Die Studierenden lernen/üben u.a.: Vergleiche anzustellen, über Erfahrungen zu sprechen und sie zu bewerten, über Alltagsaktivitäten zu berichten und diese zu planen, über vergangene Ereignisse zu berichten und Zustände und Probleme zu beschreiben und vergleichen. Dazu werden entsprechende, hierfür notwendige grammatische Themen bzw. Wortschatz behandelt. Es werden Strategien vermittelt, die mündlich wie schriftlich eine Verständigung trotz noch geringer Sprachkenntnisse ermöglichen. Außerdem werden Möglichkeiten aufgezeigt, den Lernprozess

eigenverantwortlich effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern. Die Studierenden üben soziale und interkulturelle kommunikative Kompetenz durch kooperatives Handeln und Mediation (auch online).

Im Unterricht wird zugleich auf die grammatikalischen und phonetischen Unterschiede zwischen Sprachvarietäten des Portugiesisch eingegangen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A2 des GER.

Nach Abschluss des Moduls sind die Studierenden in der Lage, im Gespräch einfache Sätze und Redewendungen zu einem erweiterten Spektrum an vertrauten Themen zu verstehen und gebrauchen. Dabei handelt es sich um grundlegende Informationen zu alltäglichen oder studien- bzw. berufsrelevanten Themen unter Einbeziehung landeskundlicher Aspekte.

Sie können beispielsweise sich und andere Personen, persönliche Wohnsituation, Gesundheitszustand, Freizeitverhalten und berufliche Situation beschreiben. Sie können die vergangenen Ereignisse in Perfekt verstehen und schriftlich und mündlich ausdrücken.

Die Studierenden können längere Texte und Briefe zu vertrauten Themen verstehen, in denen gängige aber einfache alltags- oder berufsbezogene Sprache verwendet wird und in denen vorhersehbare Informationen zu finden sind. Sie können kurze, informative Texte oder Mitteilungen zu grundlegenden Situationen in Alltag und Studium verfassen.

Die Studierenden können erkennen, wenn Schwierigkeiten auftreten und in einfacher Sprache andeuten, welcher Art das Problem offenkundig ist. Sie können die Hauptpunkte kurzer, einfacher Gespräche oder Texte zu alltäglichen Themen von unmittelbarem Interesse übermitteln, sofern diese klar in einfacher Sprache ausgedrückt sind.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Dadurch wird die Interaktion und Mediation mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln, unter Berücksichtigung der sozialen und interkulturellen Kompetenz. Lernautonomie und Medienkompetenz werden angestrebt.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

### **Reading List:**

Lehrbuch (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Portugiesisch A2.1 (Seminar, 2 SWS)

de Sena Lang J

Portugiesisch A2.1 (Seminar, 2 SWS)

de Sena Lang J, Paiva Pissarra R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0808: Portuguese B1.2 | Portugiesisch B1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht. Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Bestandene Abschlussklausur oder gesicherte Kenntnisse der Niveau B1.1.

#### Content:

In diesem Modul werden Kenntnisse in Portugiesisch gefestigt und erweitert, unter Berücksichtigung plurikultureller, plurilingualer und landeskundlicher, studienbezogener Aspekte, die es den Studierenden ermöglichen, sich in vertrauten Situationen (Studium, Arbeit, Freizeit und Familie) und zu Themen von allgemeinem Interesse wie z. B. Kunst, Geschichte, soziales Engagement, selbständig und sicher in der Zielsprache zu äußern und zu verstehen, wenn Standardsprache der verschiedenen Varietäten des Portugiesisch verwendet wird.

Die Studierenden erarbeiten ein erweitertes Spektrum an Vokabular und Redewendungen, erfassen und benutzen ein grundlegendes Repertoire an logischen Haupt- und Nebensatz-Strukturen mit Konjunktiv. Sie lesen selbständiger Texte über Ihrem Studiumfeld und weitere globale, wissenschaftliche und literarische Texte und äußern sich schriftlich und mündlich

darüber. Dazu werden entsprechende hierfür notwendige grammatikalische Themen erlernt und angewendet.

Es werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiv zu gestalten und damit die eigene Lernfähigkeit zu verbessern. Die Studierenden üben soziale und interkulturelle kommunikative Kompetenz durch kooperatives Handeln und Mediation (auch online).

Im Unterricht wird zugleich auf die grammatikalischen und phonetischen Unterschiede zwischen Sprachvarietäten des Portugiesisch eingegangen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1 des GER.

Nach Abschluss des Moduls sind die Studierenden in der Lage sich in den meisten Situationen, denen man in Studium oder Beruf, Freizeit und auf Reisen im Sprachgebiet begegnet, sicher zu verständigen. Sie können z.B. Informationen aus Zeitungstexten weitergeben, über lebenswerte Städte diskutieren, Personen und Dinge genauer beschreiben, Meinungen äußern und argumentieren.

Sie können wesentliche Inhalte in einfachen, authentischen Sachtexten, literarischen Texten und in Fernseh- oder Radiosendungen verstehen und wiedergeben und sich spontan an Gesprächen zu Themen von allgemeinem Interesse beteiligen. Sie können einfache formelle E-Mails und längere persönliche Briefe verfassen und von persönlichen Erfahrungen berichten. Sie können die wesentlichen Punkte langer Texte übermitteln, die in unkomplizierter Sprache zu Themen von persönlichem Interesse formuliert sind, sofern man die Bedeutung einzelner Wendungen überprüfen kann.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Dadurch wird die Interaktion und Mediation mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln, unter Berücksichtigung der sozialen und interkulturellen Kompetenz. Lernautonomie und Medienkompetenz werden angestrebt.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

angefertigte/zusammengestellte Lehrmaterialien; multimedial gestütztes Lehr- und Lernmaterial, auch online.

### **Reading List:**

Vom Kursleiter selbst angefertigte / zusammengestellte Übungen und Materialien; Auszüge aus kopierbaren Lehrmaterialien; Online-Materialien

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Portugiesisch B1.2 (Seminar, 2 SWS)

Werkhausen R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0809: Portuguese B1.1 | Portugiesisch B1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht. Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Bestandene Abschlussklausur oder gesicherte Kenntnisse der Niveau A2.

#### Content:

In diesem Modul werden Kenntnisse in Fremdsprache Portugiesisch unter Berücksichtigung plurikultureller, plurilingualler, landeskundlicher und studienbezogener Aspekte, die es den Studierenden ermöglichen, sich in vertrauten Situationen (Studium, Arbeit, Freizeit und Familie) und zu Themen von allgemeinem Interesse wie z. B. Konsum, Zukunft, Umwelt und Gesellschaft, selbständig und sicher in der Zielsprache zu verständigen, wenn Standardsprache der verschiedenen Varietäten des Portugiesisch verwendet wird.

Die Studierenden wiederholen und ergänzen elementare Aspekte der Grammatik wie den Gebrauch der Zeiten und der Präpositionen. Es werden auch gängige Redemittel bei Argumentation vermittelt und geübt. Sie lernen/üben den Gebrauch reflexiver Verben und das Passiv, wie man bestimmte Haltungen, Kenntnisse, Warnungen, Meinungen, Ziele und

Bewertungen ausdrückt; wie man Empfehlungen und Ratschläge gibt; wie man die persönliche Auslegung eines Gedankens erklärt; wie man in der Gruppe über ein Thema diskutiert, um Erklärungen bittet und sich auf das Gesagte bezieht.

Es werden Möglichkeiten aufgezeigt, den Lernprozess eigenverantwortlich effektiver zu gestalten und damit die eigene Lernfähigkeit zu verbessern. Die Studierenden üben soziale und interkulturelle kommunikative Kompetenz durch kooperatives Handeln und Mediation (auch online).

Im Unterricht wird zugleich auf die grammatikalischen und phonetischen Unterschiede zwischen Sprachvarietäten des Portugiesisch eingegangen.

### **Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1.1 des GER.

Nach Abschluss des Moduls sind die Studierenden in der Lage sich in den meisten Situationen, denen man in Studium, Beruf und Freizeit im Sprachgebiet begegnet, sicher zu verständigen und zu alltäglichen Themen eine persönliche Meinung äußern und widersprechen bzw. für und gegen etwas argumentieren.

Sie können sich über kulturelle Unterschiede und Sprache austauschen; Ratschläge, Warnungen und Meinungen aussprechen und schreiben; die meisten Situationen bewältigen, denen man auf Reisen und im Sprachgebiet begegnet; über Erfahrungen und Ereignisse berichten, Träume, Hoffnungen und Ziele beschreiben und dies auch begründen oder erklären; über persönliche Themen, und zu Ihrem Studiumfeld, kurze Texte schreiben.

Die Studierenden können andere Menschen einladen, ihr Fachwissen, ihre eigenen Erfahrungen und Sichtweise einzubringen. Sie können Informationen in klaren, gut strukturierten Texten zu Themen übermitteln, die ihnen vertraut oder von persönlichem oder aktuellem Interesse sind, obwohl der begrenzte Wortschatz gelegentlich zu Formulierungsproblemen führen kann.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechübungen erarbeitet werden. Durch die Kombination dieser Übungen in Einzel-, Partner- und Gruppenarbeit wird der kommunikative und handlungsorientierte Ansatz umgesetzt. Dadurch wird die Interaktion und Mediation mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln, unter Berücksichtigung der sozialen und interkulturellen Kompetenz. Lernautonomie und Medienkompetenz werden angestrebt.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

angefertigte/zusammengestellte Lehrmaterialien; multimedial gestütztes Lehr- und Lernmaterial, auch online.



**Reading List:**

Vom Kursleiter selbst angefertigte / zusammengestellte Übungen und Materialien; Auszüge aus kopierbaren Lehrmaterialien; Online-Materialien

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Portugiesisch B1.1 (Seminar, 2 SWS)

Werkhausen R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1001: Swedish A1 | Schwedisch A1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Schwedisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen trotz geringer Sprachkenntnisse zurechtzufinden.

Wir lernen / üben grundlegendes Vokabular zu Themen wie Familie, Wohnen, Beruf, Freizeit, Landeskunde und in einfach strukturierten Haupt- und Nebensätzen Alltägliches im Präsens zu berichten; Plural der Nomen; Personal-, Reflexiv-, Demonstrativ- und einige Possessivpronomen; einfache Negationsformen; den Gebrauch einiger Modalverben und Präpositionen; Adjektivdeklination.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 des GER. Der/die Studierende erlangt Grundkenntnisse in der Fremdsprache Schwedisch mit alltagspraktischer Orientierung unter Berücksichtigung kultureller und landeskundlicher Aspekte. Nach Abschluss dieses Moduls kann er/sie alltägliche Ausdrücke und sehr einfache Sätze verstehen und verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen. Der/die Studierende kann sich auf einfache Art verständigen, wenn die Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen. Er/Sie kann beispielsweise einfache Fragen zu Person und Familie stellen und beantworten sowie Verabredungen treffen.

Sowohl im mündlichen als auch im schriftlichen Sprachgebrauch ist der/die Studierende in der Lage, situationsadäquat, bzw. der A1-Stufe entsprechend, Wortschatz und Grammatik korrekt anzuwenden.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-Partner- und Gruppenarbeit; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen.

Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Schwedisch A1 (Seminar, 2 SWS)

Dai Javad P, Matyas E, Noreen-Thönebe J, Vinlöf N

Blockkurs Schwedisch A1 (Seminar, 2 SWS)

Thunstedt C

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1002: Swedish A2 | Schwedisch A2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Bestandene Abschlussklausur A1

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Schwedisch vermittelt, die es den Studierenden - trotz noch geringer Sprachkenntnisse – ermöglichen sollen, sich in alltäglichen Grundsituationen zurechtzufinden.

Wir lernen/üben grundlegendes Vokabular und Konversation und produzieren auch kürzere Texte (z. B. Brief; Textzusammenfassung und Kurzpräsentationen); vertiefen und erweitern die Grammatik aus der A1-Stufe und lesen Texte in leicht leserlicher Form.

Grammatische Inhalte: Wiederholung der Pronomen; Komplettierung der Possessivpronomen; komplexer strukturierte Haupt- und Nebensätze mit Modalverben; Imperativ; Präteritum; Perfekt

und Plusquamperfekt; Zeitausdrücke /-angaben; Zeit-, Ort- und Richtungsadverbien, Steigerung des Adjektivs.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A2 des GER. Der/Die Studierende erlangt Grundkenntnisse in Schwedisch mit allgemein sprachlicher Orientierung unter Berücksichtigung kultureller und landeskundlicher Aspekte. Nach Abschluss dieses Moduls kann der/die Studierende im Gespräch einfache Sätze und Redewendungen zu einem erweiterten Spektrum an vertrauten Themen verstehen und gebrauchen. Dabei handelt es sich um grundlegende Informationen zu alltäglichen Themen unter Einbeziehung landeskundlicher Aspekte. Der/die Studierende ist in der Lage kurze informative Texte oder Mitteilungen zu grundlegenden Situationen zu verfassen und kann längere Texte zu vertrauten Themen verstehen, in denen gängige bzw. einfache alltagsbezogene Sprache verwendet wird und in denen vorhersehbare Informationen zu finden sind.

Sowohl im mündlichen als auch im schriftlichen Sprachgebrauch ist der/die Studierende in der Lage, situationsadäquat, bzw. der A2-Stufe entsprechend, Wortschatz und Grammatik korrekt anzuwenden.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-Partner- und Gruppenarbeit; Kontrolliertes Revidieren einzelner Aspekte der Grammatik mit vorgegebenen (online-) Materialien; Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen.

Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch (wird in der LV bekannt gegeben); multimedial gestütztes Lehr- und Lernmaterial

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Schwedisch A2 (Seminar, 2 SWS)

Dai Javad P

Schwedisch A2 (Seminar, 2 SWS)

Dai Javad P, Matyas E

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1003: Swedish B1 | Schwedisch B1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

Die Prüfungsleistungen sind in ihrer Gesamtheit so konzipiert, dass die Anwendung von Wortschatz und Grammatik, das Lese- und/oder Hörverstehen sowie die freie Textproduktion geprüft werden.

Mündliche Kommunikationsfähigkeiten werden anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Bestandene Abschlussklausur A2

#### Content:

In diesem Modul werden Kenntnisse der Fremdsprache Schwedisch erarbeitet, die es den Studierenden ermöglichen, sich in vertrauten Situationen (Studium, Arbeit, Freizeit und Familie) und zu Themen von allgemeinem Interesse wie z. B. Film, Musik, Sport selbständig in der Zielsprache zu äußern, wenn Standardsprache verwendet wird.

Kommunikationsmöglichkeiten (Vokabular, Redewendungen, Dialogmuster etc.) zu den genannten Bereichen, ergänzen das Repertoire an Nebensätzen.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau B1 des GER. Der/Die Studierende erlangt Kenntnisse in der Fremdsprache Schwedisch auf standardsprachlichem Niveau unter Berücksichtigung interkultureller, landeskundlicher und studienbezogener Aspekte.

Nach Abschluss des Moduls kann der/die Studierende sich in den meisten Situationen, denen man in Studium oder in der Freizeit im Sprachgebiet begegnet, sicher verständigen und zu alltäglichen Themen eine persönliche Meinung äußern und widersprechen bzw. für und gegen etwas argumentieren.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Lese-, Schreib- und Sprechübungen; Einzel-Partner- und Gruppenarbeit; Kontrolliertes Revidieren der Grundgrammatik mit vorgegebenen (online-)Materialien; Referieren nach vorgegebenen Kriterien; diskutieren in Gruppen zu vorbereiteten Themen und nach vorgegebenen Kommunikationsmustern. Freiwillige Hausaufgaben zur Vor- und Nachbearbeitung festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial

**Reading List:**

Lehrbuch (wird in der LV bekannt gegeben); multimedial gestütztes Lehr- und Lernmaterial

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Schwedisch B1 (Seminar, 2 SWS)

Dai Javad P, Noreen-Thönebe J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1201: Spanish A1 | Spanisch A1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Spanisch vermittelt, die es den Studierenden ermöglichen, sich in vertrauten und alltäglichen Grundsituationen trotz noch geringer Sprachkenntnisse zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.

Die Studierenden lernen, einfache Fragen zur Person/Familie zu stellen und zu beantworten, Anmeldeformulare mit persönlichen Daten auszufüllen, über Studium, Beruf und Freizeitaktivitäten zu sprechen, Gefallen, Interessen und Vorlieben auszudrücken, Orte zu beschreiben etc. Sie lernen/üben grundlegendes Vokabular zu diesen Themen und berichten in einfach strukturierten Hauptsätzen über Alltägliches im Präsens. Es werden u.a. folgende Themen der Grammatik behandelt: Präsens regelmäßiger und (einige) unregelmäßiger Verben, bestimmte und unbestimmte Artikel, Demonstrativpronomen, Verneinung einfacher Sätze etc.



Es werden Strategien vermittelt, die eine Verständigung in alltäglichen Grundsituationen ermöglichen.

**Intended Learning Outcomes:**

Das Modul orientiert sich am Niveau A1 „Elementare Sprachverwendung“ des GER.

Der/die Studierende kann nach der Teilnahme an der Modulveranstaltung einfache Fragen über vertraute Themen stellen und beantworten. Er/sie kann sich auf einfache Art verständigen, wenn die Gesprächspartnerinnen oder Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen. Er/sie kann einfache schriftliche Mitteilungen zur Person machen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch A1 (Seminar, 2 SWS)

Galan Rodriguez F, Garcia Garcia M, Gonzalez Sainz C, Guerrero Madrid V, Hernandez Zarate M, Lopez Agudo E, Martinez Wahnou A, Rey Pereira C, Rodriguez Garcia M, Tapia Perez T, Zuniga Chinchilla L

Blockkurs Spanisch A1 (Seminar, 2 SWS)

Garcia Garcia M, Gomez Cabornero S, Guerrero Madrid V, Pardo Gascue F, Rodriguez Garcia M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1202: Spanish A2.1 | Spanisch A2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe A1.  
Einstufungstest mit Ergebnis A2.1.

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Spanisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden, z.B. Freizeitaktivitäten, auf Reisen, im Restaurant, unter Kommilitonen, Freunden und Nachbarn, Austausch von Erfahrungen etc. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.

Die grammatikalischen Strukturen werden weiter aufgebaut, wie z.B. die Verwendung von den Vergangenheiten pretérito perfecto - pretérito indefinido, ser und estar, unbetonte Personal Pronomen etc.

Es werden Strategien vermittelt, die mündlich wie schriftlich eine Verständigung trotz noch geringer Sprachkenntnisse ermöglichen.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich am Niveau A2 „Elementare Sprachverwendung“ der GER. Nach der Teilnahme an der Modulveranstaltung sind die Studierenden in der Lage, die Bedeutung von kurzen, klaren und deutlich artikulierten Mitteilungen und Durchsagen zu erfassen. Die Kommunikation ist im Rahmen von einfachen, routinemäßigen Kontexten möglich. Der Austausch von Informationen erfolgt über kurze Dialoge mit verschiedenen Zeitbezügen (z.B. Gegenwart, Vergangenheit, einfaches Futur) und umfasst einfache Satzgefüge mit beschränkten Strukturen zu vertrauten Tätigkeiten. Der/Die Studierende kann einfache Fragen zu Inhalten stellen und auch beantworten. Gespräche und Dialoge sind kurz, zeitlich beschränkt und orientieren sich inhaltlich an Kontexten, wie z.B. Familie, Freunde, Lebens- und Wohnraum, Reisen. Die Studierenden können kurze Texte oder Briefe lesen und verstehen, wenn diese einen häufig gebrauchten Wortschatz und bekannte Strukturen beinhaltet und wenn darin vertraute Informationen zu finden sind. Er/Sie ist in der Lage mithilfe feststehender Wendungen kurze, einfache Mitteilungen oder persönliche Briefe zu verfassen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch A2.1 (Seminar, 2 SWS)

Galan Rodriguez F, Guerrero Madrid V, Hernandez Zarate M, Mayea von Rimscha A, Rey Pereira C, Tapia Perez T

Blockkurs Spanisch A2.1 (Seminar, 2 SWS)

Galan Rodriguez F, Mayea von Rimscha A, Tapia Perez T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1203: Spanish A2.2 | Spanisch A2.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe A2.1.  
Einstufungstest mit Ergebnis A2.2.

#### Content:

In diesem Modul werden weitere Grundkenntnisse der Fremdsprache Spanisch vermittelt, die den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Die Studierenden lernen/üben u.a. Anweisungen und Ratschläge zu geben; Situationen und Ereignisse in der Vergangenheit zu schildern; Geschichten zu erzählen; über die Wohnungssuche zu sprechen. Dazu werden entsprechende hierfür notwendige grammatikalische Themen behandelt wie die Verwendung und Kontrast der Zeiten der Vergangenheit, pretérito imperfecto und pretérito indefinido, das Imperativ, das Gebrauch von Präpositionen etc. Es werden Strategien vermittelt, die eine Verständigung trotz noch geringer Sprachkenntnisse (in alltäglichen Grundsituationen) ermöglichen.

### **Intended Learning Outcomes:**

Dieses Modul orientiert sich am Niveau A2 „Elementare Sprachverwendung“ des GER. Nach der Teilnahme an der Modulveranstaltung sind die Studierenden in der Lage vertraute Sätze und Redewendungen zu einem erweiterten Spektrum an Themen zu verstehen. Dabei handelt es sich um grundlegende Informationen zu alltäglichen oder Studien- bzw. berufsrelevanten Themen. Sie erfassen die Bedeutung von kurzen, klaren und deutlich artikulierten Mitteilungen und Durchsagen. Der Austausch von Informationen erfolgt kurz aber mühelos über eine Reihe bekannter Äußerungen zu vertrauten Tätigkeiten und Themen. Die Studierenden können sich aktiv in kurzen Interaktionen, die über einen beschränkten zeitlichen Umfang gehen, zu bekannten Themen einbringen. Er/Sie kann längere Texte und Briefe zu vertrauten Themen verstehen, in denen gängige aber einfache alltags- oder berufsbezogene Sprache verwendet wird und in denen vorhersehbare Informationen zu finden sind. Der/Die Studierende ist in der Lage, mithilfe feststehender Wendungen kurze, informative Texte oder Mitteilungen zu verfassen. Es werden Haupt- und Nebensätze verwendet, die durch eine Reihe von Bindewörtern kontextadäquat verbunden werden.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

### **Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch A2.2 (Seminar, 2 SWS)

Gomez Cabornero S, Guerrero Madrid V, Mayea von Rimscha A, Pardo Gascue F, Tapia Perez T

Blockkurs Spanisch A2.2 (Seminar, 2 SWS)

Tapia Perez T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ12031: Spanish A2.1 + A2.2 | Spanisch A2.1 + A2.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe A1.  
Einstufungstest mit Ergebnis A2.1.

#### Content:

In diesem Modul werden weitere Grundkenntnisse der Fremdsprache Spanisch vermittelt, die den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Die Studierende lernen/üben u.a.: wie man eine Wohnung sucht; wie man Erfahrungen austauscht; wie man Anweisungen, und Ratschläge gibt; wie man Situationen und Ereignisse in der Vergangenheit schildert; wie man Geschichten erzählt. Dazu werden entsprechende hierfür notwendige grammatikalische Themen behandelt und vertieft. Es werden Strategien vermittelt, die eine Verständigung trotz noch geringer Sprachkenntnisse (in alltäglichen Grundsituationen) ermöglichen.



### **Intended Learning Outcomes:**

Dieses Modul orientiert sich am Niveau A2 „Elementare Sprachverwendung“ des GER. Nach der Teilnahme an der Modulveranstaltung sind die Studierenden in der Lage, vertraute Sätze und Redewendungen zu einem erweiterten Spektrum an Themen zu verstehen. Dabei handelt es sich um grundlegende Informationen zu alltäglichen oder Studien- bzw. berufsrelevanten Themen. Sie erfassen die Bedeutung von kurzen, klaren und deutlich artikulierten Mitteilungen und Durchsagen. Der Austausch von Informationen erfolgt kurz aber mühelos über eine Reihe bekannter Äußerungen zu vertrauten Tätigkeiten und Themen. Die Studierenden können sich aktiv in kurzen Interaktionen, die über einen beschränkten zeitlichen Umfang gehen, zu bekannten Themen einbringen. Er/Sie kann längere Texte und Briefe zu vertrauten Themen verstehen, in denen gängige aber einfache alltags- oder berufsbezogene Sprache verwendet wird und in denen vorhersehbare Informationen zu finden sind. Der/Die Studierende ist in der Lage mithilfe feststehender Wendungen kurze, informative Texte oder Mitteilungen zu verfassen. Es werden Haupt- und Nebensätze verwendet, die durch eine Reihe von Bindewörtern kontextadäquat verbunden werden.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

### **Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch A2.1 + A2.2 (intensiv) (Seminar, 4 SWS)

Alfonso A, Gonzalez Sainz C, Mayea von Rimscha A, Rey Pereira C

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1207: Spanish A1 + A2.1 | Spanisch A1 + A2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

In diesem Modul werden Grundkenntnisse in der Fremdsprache Spanisch vermittelt, die es den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden, z.B. auf Reisen, im Restaurant, unter Kommilitonen, Freunden und Nachbarn, Austausch von Erfahrungen etc. Die Studierenden lernen Fragen zur Person/Familie zu stellen und zu beantworten, Anmeldeformulare mit persönlichen Daten auszufüllen, über Studium, Beruf und Freizeitaktivitäten zu sprechen, Gefallen, Interessen und Vorlieben auszudrücken, Orte zu beschreiben. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.

Es werden u.a. folgende Themen der Grammatik behandelt: Präsens regelmäßiger und unregelmäßiger Verben, bestimmte und unbestimmte Artikel, Demonstrativpronomen, Verneinung einfacher Sätze, Verwendung von den Vergangenheiten pretérito perfecto - pretérito indefinido, ser und estar, unbetonte Personal Pronomen etc.

Es werden Strategien vermittelt, die eine Verständigung in alltäglichen Grundsituationen ermöglichen.

**Intended Learning Outcomes:**

Die Lernergebnisse orientieren sich am Niveau A2 „Elementare Sprachverwendung“ des GER. Der/die Studierende kann nach der Teilnahme an der Modulveranstaltung sich auf einfache Art verständigen, wenn die Gesprächspartner\*in langsam und deutlich sprechen und bereit sind zu helfen. Er/sie ist in der Lage die Bedeutung von kurzen, klaren und deutlich artikulierten Mitteilungen und Durchsagen zu erfassen. Die Kommunikation ist im Rahmen von einfachen, routinemäßigen Kontexten möglich. Der Austausch von Informationen erfolgt über kurze Dialoge mit verschiedenen Zeitbezügen (z.B.: Gegenwart, Vergangenheit, einfaches Futur) und umfasst einfache Satzgefüge mit beschränkten Strukturen zu vertrauten Tätigkeiten. Der/Die Studierende kann einfache Fragen zu Inhalten stellen und auch beantworten. Gespräche und Dialoge sind kurz, zeitlich beschränkt und orientieren sich inhaltlich an Kontexten, wie z.B. Familie, Freunde, Lebens- und Wohnraum, Reisen. Die Studierenden können kurze Texte oder Briefe lesen und verstehen, wenn diese einen häufig gebrauchten Wortschatz und bekannte Strukturen beinhaltet und wenn darin vertraute Informationen zu finden sind. Er/Sie ist in der Lage mithilfe feststehender Wendungen kurze, einfache Mitteilungen oder persönliche Briefe zu verfassen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch A1 + A2.1 (intensiv) (Seminar, 4 SWS)

Garcia Garcia M, Nevado Cortes C, Pardo Gascue F, Rodriguez Garcia M, Zuniga Chinchilla L  
For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1209: Spanish C1 - current issues in Spain and Latin America | Spanisch C1 - La actualidad en España y América Latina

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe B2.2.

Einstufungstest mit Ergebnis C1.1.

#### Content:

In diesem Modul werden den Studierenden kulturelle, soziopolitische und/oder geschichtliche Kenntnisse über die spanischsprachigen Länder vermittelt, die sie in die Lage versetzen, unter Einbeziehung interkultureller Aspekte zu kommunizieren und zu handeln. Diese Veranstaltung bietet einen Querschnitt durch die Kultur und Gesellschaft Spaniens und Lateinamerika, indem gesellschaftliche Tendenzen anhand aktueller Zeitungsartikeln, Literatur (Kurzerzählungen), Essays, Filme etc., diskutiert werden. Es soll den Studierenden eine Vertiefung in das „Fremdverstehen“ der gesamten spanischsprachigen Welt ermöglichen und somit auch die interkulturelle Kompetenz erhöht werden. Es wird ein erweitertes Spektrum an Kommunikationsmöglichkeiten zu aktuellen Themen erarbeitet und Aspekte der Grammatik wiederholt und ergänzt.

In diesem Modul haben die Studierenden die Gelegenheit, eine kurze Präsentation eigenverantwortlich zu gestalten und vorzutragen sowie anschließend auf Fragen zur eigenen Präsentation zu antworten.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich an Niveau C1 „Kompetente Sprachverwendung“ des Gemeinsamen Europäischen Referenzrahmens für Sprachen des Europarats.

Nach Abschluss des Moduls kann der/die Studierende ein breites Spektrum anspruchsvoller, längerer Texte verstehen und auch implizite Bedeutungen erfassen. Er/Sie kann sich spontan und fließend ausdrücken, ohne öfter deutlich erkennbar nach Worten suchen zu müssen. Er/Sie kann die Sprache im gesellschaftlichen und beruflichen Leben oder in Ausbildung und Studium wirksam und flexibel gebrauchen. Die Studierenden können sich klar, strukturiert und ausführlich zu komplexen Sachverhalten äußern und dabei verschiedene Mittel zur Textverknüpfung angemessen verwenden. Er/Sie kann ihre Gedanken und Meinungen präzise ausdrücken und ihre eigenen Beiträge geschickt mit denen anderer verknüpfen.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen; Eigenständiges Referieren und Präsentieren akademischer und gesamtgesellschaftlicher Inhalte zu vorgegebenen Themen.

**Media:**

Multimedial gestütztes Lehr- und Lernmaterial, auch online.

**Reading List:**

Wird in der Lehrveranstaltung bekanntgegeben.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch C1 - La actualidad en España y América Latina (Seminar, 2 SWS)

Garcia Garcia M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1212: Spanish C1 - Spain and Latin America - Yesterday and Today | Spanisch C1 - España y América Latina ayer y hoy

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe B2.2.

Einstufungstest mit Ergebnis C1.1.

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Spanisch erarbeitet, die es den Studierenden ermöglichen, mündlich wie schriftlich in Themenbereichen aus Alltag, Beruf, Kultur, Gesichte, Politik der spanischsprachigen Länder situationsadäquat zu handeln (agieren und reagieren). Anhand ausgewählter Presseartikeln, Literatur, etc., werden soziokulturelle Zusammenhänge aktueller Themen reflektiert. Es werden Kenntnisse in den benannten Bereichen vertieft und Aspekte der Grammatik wiederholt und ergänzt. In diesem Modul haben die Studierenden die Gelegenheit, eine kurze Präsentation eigenverantwortlich zu gestalten und vorzutragen sowie anschließend auf Fragen zur eigenen Präsentation zu antworten.



### **Intended Learning Outcomes:**

Dieses Modul orientiert sich an Niveau C1 „Kompetente Sprachverwendung“ des GER. Nach der Teilnahme an der Modulveranstaltung kann der/die Studierende auf sehr hohem Niveau in unterschiedlichsten Situationen mündlich und schriftlich kommunizieren. Er/Sie ist in der Lage, die Fremdsprache sowohl im Auslandsstudium als auch im Beruf wirksam und flexibel zu gebrauchen. Die Studierenden können komplexe Sachverhalte ausführlich darstellen und dabei Themenpunkte miteinander verbinden, bestimmte Aspekte besonders ausführen und ihren Beitrag angemessen abschließen. Er/Sie kann ein breites Spektrum anspruchsvoller, längerer Texte verstehen und auch implizite Bedeutungen erfassen. Er/Sie kann sich spontan und fließend ausdrücken, ohne öfter deutlich erkennbar nach Worten suchen zu müssen. Er/Sie kann sich klar, strukturiert und ausführlich zu komplexen Sachverhalten äußern und dabei verschiedene Mittel zur Textverknüpfung angemessen verwenden.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezieltem Hör-, Lese-, Schreib- und Sprechübungen in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Übungen wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern. Durch kontrolliertes Revidieren grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Kenntnisse vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

Referieren und Präsentieren nach vorgegebenen Kriterien; moderierte (Rollen-) Diskussionen; Eigenständiges Referieren und Präsentieren akademischer und gesamtgesellschaftlicher Inhalte zu vorgegebenen Themen.

### **Media:**

Multimedial gestütztes Lehr- und Lernmaterial, auch online.

### **Reading List:**

Wird in der Lehrveranstaltung bekanntgegeben.

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1216: Spanish B1.2 | Spanisch B1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe B1.1.  
Einstufungstest mit Ergebnis B1.2.

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Spanisch erarbeitet, die es den Studierenden ermöglichen, (sich) in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse wie Film, Musik, Sport u.a. selbständig und sicher in der Zielsprache zu operieren/bewegen/verständigen, wenn Standardsprache verwendet wird. Sie erweitern Ihren Wortschatz sowie festigen und vertiefen die bisher erlernten grammatischen Schwerpunkte der spanischen Sprache. Dabei werden interkulturelle, landeskundliche und studienbezogene Aspekte berücksichtigt. Die Studierenden vertiefen ihre Kenntnisse anhand verschiedener aktueller Themen des spanischsprachigen Raums. Dazu werden entsprechende, hierfür notwendige grammatische Themen und Wortschatz behandelt.

### **Intended Learning Outcomes:**

Dieses Modul orientiert sich am Niveau B1 „Selbständige Sprachverwendung“ des GER. Der/Die Studierende erlangt vertiefte Kenntnisse in der Fremdsprache Spanisch auf standardsprachlichen Niveau unter Berücksichtigung interkultureller, landeskundlicher und studienbezogener Aspekte. Nach Abschluss des Moduls kann der/die Studierende sich in den meisten Situationen, denen man im Studium oder Beruf, Freizeit und auf Reisen im Sprachgebiet begegnet, sicher verständigen. Er/Sie ist in der Lage, wesentliche Inhalte in einfachen, authentischen Sachtexten, Fernseh- oder Radiosendungen und literarischen Texten zu verstehen und wiederzugeben und sich spontan an Gesprächen zu vertrauten Themen von allgemeinem Interesse zu beteiligen. Der/Die Studierende kann einfache formelle und längere persönliche Briefe und Texte verfassen, strukturiert zu einem alltäglichen Thema von persönlichem Interesse referieren und schriftlich eine logisch begründete Stellungnahme zu einem aktuellen Thema verfassen, wenn Hilfestellung gegeben wird.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

### **Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch B1.2 (Seminar, 2 SWS)

Galan Rodriguez F, Tapia Perez T, Zuniga Chinchilla L

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1217: Spanish B2.2 | Spanisch B2.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe B2.1.  
Einstufungstest mit Ergebnis B2.2.

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Spanisch erarbeitet, die es den Studierenden ermöglichen, aktiv und weitgehend flüssig über Themen von allgemeinem Interesse oder in vertrauten Fachgebieten mit einem Muttersprachler zu kommunizieren und eine Argumentation strukturiert auszuführen. Ein besonderes Augenmerk wird in diesem Modul auf die Entwicklung von Lesestrategien allgemeiner, akademischer und fachbezogener Texten, auf Wortschatzarbeit sowie die Befähigung zur Entwicklung von Hörstrategien gelegt. Zur Festigung der mündlichen und schriftlichen Fertigkeit werden Schwerpunkte der Grammatik (z.B. *contraste de pasados, indicativo/subjuntivo, estilo indirecto, oraciones subordinadas complejas* 2) erarbeitet, wiederholt und vertieft.

In diesem Modul haben die Studierenden die Gelegenheit, eine kurze Präsentation eigenverantwortlich zu gestalten und vorzutragen sowie anschließend auf Fragen zur eigenen Präsentation zu antworten.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich am Niveau B2 „Selbständige Sprachverwendung“ des GER. Der/die Studierende erlangt Kenntnisse in der Fremdsprache Spanisch auf schriftsprachlichem Niveau unter Berücksichtigung interkultureller, landeskundlicher und studienbezogener Aspekte. Er/Sie kann mühelos unterschiedlichste Texte, Artikel und Berichte aus Fachbüchern, Zeitschriften und Magazinen zu einem breiten Spektrum an Themen lesen und verstehen. Er/Sie kann in den Texten verschiedene Meinungsbilder, Standpunkte und Haltungen erkennen. Er/Sie ist in der Lage, zeitgenössische Prosatexte zu lesen. Der/Die Studierende kann längere Redebeiträge und Vorträge mühelos verstehen und komplexer Argumentation folgen, sofern sie klar vorgetragen werden. Der/Die Studierende ist in der Lage, klare und detaillierte Texte zu verschiedenen Themen, die von besonderem Interesse für ihn/sie sind oder zu seinem/ihrem Fachgebiet gehören zu verfassen und dabei kohärent zu argumentieren und fachspezifisches Vokabular zu benutzen. Er/Sie kann die eigenen Ansichten und Standpunkte begründen und verteidigen, seine/ ihre Argumentation logisch aufbauen und verbinden sowie Vor- und Nachteile bezüglich einer Entscheidung darlegen. Er/Sie kann sich spontan und fließend verständigen. Er/Sie kann zu vielen Themen aus seinen/ihren Interessen- oder Fachgebieten klar und strukturiert in mündlicher Form kommunizieren.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch B2.2 (Seminar, 2 SWS)

Hernandez Zarate M, Nevado Cortes C

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1218: Spanish B1.1 | Spanisch B1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe A2.2.  
Einstufungstest mit Ergebnis B1.1.

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Spanisch erarbeitet, die es den Studierenden ermöglichen, (sich) in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse selbständig und sicher zu operieren/bewegen/verständigen, wenn Standardsprache verwendet wird. Sie erweitern Ihren Wortschatz sowie festigen und vertiefen die bisher erlernten grammatikalischen Schwerpunkte der spanischen Sprache. Die Studierenden lernen/üben u.a. wie man Vermutungen anstellt; über biografische und historische Ereignisse spricht; wie man Wünsche und Gefühle ausdrückt. Dazu werden entsprechende, hierfür notwendige grammatische Themen behandelt.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich am Niveau B1 „Selbständige Sprachverwendung“ des GER. Der/Die Studierende erlangt in diesem Modul vertiefte Kenntnisse in der Fremdsprache Spanisch mit allgemeinsprachlicher Orientierung unter Berücksichtigung interkultureller und landeskundlicher Aspekte. Nach erfolgreicher Teilnahme am Modul kann der/die Studierende sich in den ihm/ihr vertrauten Situationen, denen man im Studium oder Beruf, Freizeit und auf Reisen im Sprachgebiet begegnen kann, sicher verständigen. Der/Die Studierende ist in der Lage, wesentliche Inhalte in einfachen authentischen Texten aus alltäglichen Bereichen zu verstehen, und sich spontan an Gesprächen zu vertrauten Themen zu beteiligen. Die Studierenden können mündlich wie schriftlich über Erfahrungen, Gefühle und Ereignisse einfach und zusammenhängend berichten und zu vertrauten Themen eine persönliche Meinung äußern und argumentieren.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch B1.1 (Seminar, 2 SWS)

Galan Rodriguez F, Guerrero Madrid V, Hernandez Zarate M, Martinez Wahnou A, Nevado Cortes C

Blockkurs Spanisch B1.1 (Seminar, 2 SWS)

Hernandez Zarate M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ1219: Spanish B2.1 | Spanisch B2.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe B1.2.  
Einstufungstest mit Ergebnis B2.1.

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Spanisch erarbeitet, die es den Studierenden ermöglichen, aktiv und annähernd flüssig über Themen von allgemeinem Interesse oder von vertrauten Fachgebieten mit einem Muttersprachler zu kommunizieren und dabei strukturiert zu argumentieren. Zur Festigung der mündlichen und schriftlichen Fertigkeit werden Schwerpunkte der Grammatik (z.B. futuro, imperfecto de subjuntivo, ser/estar, oraciones subordinadas complejas 1) erarbeitet, wiederholt und vertieft. In diesem Modul haben die Studierenden die Gelegenheit, eine kurze Präsentation zu gestalten, vorzutragen und anschließend auf Fragen zur eigenen Präsentation zu antworten.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich an Niveau B2 „Selbständige Sprachverwendung“ des GER. Der/die Studierende erlangt Kenntnisse in der Fremdsprache Spanisch auf schriftsprachlichem Niveau unter Berücksichtigung interkultureller, landeskundlicher und studienbezogener Aspekte. Er/Sie kann unterschiedliche Artikel und Berichte aus Büchern oder Zeitschriften, die sowohl mit eigenen Interessen als auch mit ihrem Fachgebiet in Zusammenhang stehen, sicher verstehen. Er/Sie kann längeren Redebeiträgen und Vorträgen zu aktuellen Themen folgen, sofern sie klar vorgetragen werden. Der/Die Studierende ist in der Lage, zusammenhängende Texte zu unterschiedlichen, vertrauten alltagspraktischen aber auch fachsprachlichen Themen zu verfassen und dabei auch komplexere Satzstrukturen und fachspezifisches Vokabular zu benutzen. Er/Sie kann zu vielen Themen aus seinen/ihren Interessen- oder Fachgebieten klar und strukturiert in mündlicher Form kommunizieren.

**Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

**Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch B2.1 (Seminar, 2 SWS)

Guerrero Madrid V, Martinez Wahnou A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1225: Spanish B1.1 + B1.2 | Spanisch B1.1 + B1.2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Sie beinhalten Aufgaben zur Rezeption (Lese- und Hörverstehen) sowie zur Produktion (Wortschatz und Grammatik sowie freie Textproduktion) und werden in Form von kommunikativen kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben abgehalten. Hilfsmittel erlaubt. Mündliche Produktion wird anhand der Anwendung entsprechender Redemittel in schriftlichen Dialogbeispielen überprüft und/oder in Form einer Audio-/Videodatei abgehalten. Hierzu beachten wir die Datenschutzgrundverordnung (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gesicherte Kenntnisse der Stufe A2.2.  
Einstufungstest mit Ergebnis B1.1.

#### Content:

In diesem Modul werden Kenntnisse in der Fremdsprache Spanisch erarbeitet, die es den Studierenden ermöglichen, (sich) in vertrauten Situationen, z.B. in Studium, Arbeit, Freizeit und Familie, und zu Themen von allgemeinem Interesse wie Film, Musik, Sport u.a. selbständig und sicher in der Zielsprache zu operieren/bewegen/verständigen, wenn Standardsprache verwendet wird. Sie erweitern Ihren Wortschatz sowie festigen und vertiefen die bisher erlernten grammatischen Schwerpunkte der spanischen Sprache. Dabei werden interkulturelle, landeskundliche und studienbezogene Aspekte berücksichtigt. Die Studierenden vertiefen ihre Kenntnisse anhand verschiedener aktueller Themen des spanischsprachigen Raums. Dazu werden entsprechende, hierfür notwendige grammatische Themen und Wortschatz behandelt.

### **Intended Learning Outcomes:**

Dieses Modul orientiert sich am Niveau B1 „Selbstständige Sprachverwendung“ des GER. Der/Die Studierende erlangt vertiefte Kenntnisse in der Fremdsprache Spanisch auf standardsprachlichen Niveau unter Berücksichtigung interkultureller, landeskundlicher und studienbezogener Aspekte. Nach Abschluss des Moduls kann der/die Studierende sich in den meisten Situationen, denen man im Studium oder Beruf, Freizeit und auf Reisen im Sprachgebiet begegnet, sicher verständigen. Er/Sie ist in der Lage, wesentliche Inhalte in einfachen, authentischen Sachtexten, Fernseh- oder Radiosendungen und literarischen Texten zu verstehen und wiederzugeben und sich spontan an Gesprächen zu vertrauten Themen von allgemeinem Interesse zu beteiligen. Der/Die Studierende kann einfache formelle und längere persönliche Briefe und Texte verfassen, strukturiert zu einem alltäglichen Thema von persönlichem Interesse referieren und schriftlich eine logisch begründete Stellungnahme zu einem aktuellen Thema verfassen, wenn Hilfestellung gegeben wird.

### **Teaching and Learning Methods:**

Das Modul besteht aus einem Seminar, in dem die angestrebten Lerninhalte mit gezielten Hör-, Lese-, Schreib- und Sprechaufgaben in Einzel-, Partner und Gruppenarbeit kommunikativ und handlungsorientiert erarbeitet werden. Durch die Kombination dieser Aufgaben wird die Interaktion mit den Partnern unterstützt und gefordert. Die Studierenden erwerben Teamkompetenz durch kooperatives Handeln in gemischten Gruppen.

Es werden Möglichkeiten aufgezeigt, den Lernprozess in der Fremdsprache Spanisch eigenverantwortlich und effektiver zu gestalten und damit die eigenen Lernfähigkeiten zu verbessern.

Durch kontrolliertes Selbstlernen grundlegender grammatischer Phänomene und Kommunikationsmuster in der Fremdsprache mit vorgegebenen (online-) Materialien werden die im Seminar vermittelten Grundlagen vertieft.

Freiwillige Hausaufgaben (zur Vor- und Nacharbeitung) festigen das Gelernte.

### **Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial, auch online.

### **Reading List:**

Lehrbuch (wird in der Lehrveranstaltung bekanntgegeben).

### **Responsible for Module:**

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Spanisch B1.1+B1.2 (intensiv) (Seminar, 2 SWS)

Garcia Garcia M, Lopez Agudo E

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ1404: Turkish A1.1 | Türkisch A1.1

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> Language taught	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Studien-/Prüfungsleistungen:

In den Prüfungsleistungen werden die in der Modulbeschreibung angegebenen Lernergebnisse geprüft. Die Prüfungsleistungen werden in Form von kompetenz- und handlungsorientierten (Portfolio-) Prüfungsaufgaben erbracht.

Hilfsmittel sind erlaubt.

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

Nach ersten Einblicken in die Beschaffenheit/Spezifität der Sprache (Agglutination, Vokalharmonie, Satzbau, Fehlen des grammatischen Geschlechts) werden in diesem Modul Grundkenntnisse der Fremdsprache Türkisch vermittelt, die den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte mit einbezogen. Die Studierenden ler-nen/üben einfach strukturierte Hauptsätze zu formulieren und im bestimmten Präsens zu erzählen. Zum Beispiel: Angaben zur eigenen Biografie zu machen oder zur Biografie einer Person Fragen zu stellen und zu beantworten, bezogen auf Namen, momentanes Befinden, Herkunft, Nationalität, Familienstand, Alter, Wohnort, Arbeitsplatz, Studium, Sprachen, Beruf; Zahlen zu verstehen und zu benutzen. Dazu werden entsprechende, hierfür notwendige grammatikalische Themen behandelt. Es werden Strategien vermittelt, die eine Verständigung trotz noch geringer Sprachkenntnisse (in alltäglichen Grundsituationen) ermöglichen.

**Intended Learning Outcomes:**

Dieses Modul orientiert sich am Niveau „A1.1 Elementare Sprachverwendung“ des GER. Nach der Teilnahme an der Modulveranstaltung sind die Studierenden in der Lage, vertraute alltägliche Ausdrücke und sehr einfache Sätze zu verstehen und zu verwenden, die auf die Befriedigung konkreter, in der Bewältigung des Alltags wesentlicher Bedürfnisse zielen. Er/sie kann sich und andere vorstellen, anderen Leuten Fragen zu ihrer Person stellen und auf Fragen dieser Art Antwort geben. Der/die Studierende kann sich auf einfache Art verständigen, wenn die Gesprächspartnerinnen oder Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen.

**Teaching and Learning Methods:**

Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; gezielte Hör-, Sprech-, Lese- und Schreibübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; kontrolliertes Selbst-lernen grundlegender Phänomene der Fremdsprache mit vorgegebenen Materialien. Freiwillige Hausaufgaben festigen das Gelernte.

**Media:**

Lehrbuch; multimedial gestütztes Lehr- und Lernmaterial.

**Reading List:**

Lehrbuch (wird in der LV bekannt gegeben)

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Türkisch A1.1 (Seminar, 2 SWS)

Kardes Alper T

Türkisch A1.1 (Seminar, 2 SWS)

Kardes Alper T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Generic Competences | Überfachliche Kompetenzen

### Module Description

#### SG810003: Advanced Statistics | Advanced Statistics

Version of module description: Gültig ab summerterm 2017

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

A written exam is deemed the most appropriate mode of examination (90 min). Using predetermined tools the students demonstrate their theoretical, methodological and analytic competence by answering questions, but may also be asked to do calculations as well as to analyze and interpret data.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Knowledge of study design, descriptive statistics and inferential statistics

#### Content:

- Probability theory
- Analysis of variance
- Exploratory data analysis
- Factor analysis
- Univariable and multivariable modeling
- Linear, logistic, Poisson and Cox regression models
- Meta-Analysis
- Handling of missing values
- Analysis of confounding
- Multivariate Methods

#### Intended Learning Outcomes:

After successfully completing the module, students will be able:

- To determine adequate quantitative approaches
- To understand analysis of variance and covariance analysis
- To understand fixed-effects and random-effects models
- To apply different modeling approaches
- To understand multivariate methods
- To deal with missing data
- To handle confounding
- To apply survival analysis

**Teaching and Learning Methods:**

The module consists of one lecture with blended learning components, one seminar and a tutorial. The content of the module is conveyed through lectures and presentations. In the seminar students learn to implement their theoretical knowledge by completing training tasks. The students acquire methodological knowledge and analytic competences. While the lecture is used to teach statistical models, the seminar is used to apply (use appropriate models, perform tests, interpret data) these models on research issue using the statistical software R. The tutorial is intended to provide a platform for individual support of the students in case of questions or possible gaps in presumed knowledge.

**Media:**

Slides, exercise sheets, suggested solutions

**Reading List:**

Regression, Fahrmeir, Marx, Lang and Kneib, Springer Verlag, 2013  
Further literature will be announced in the lecture.

**Responsible for Module:**

Klug, Stefanie; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Applied Statistics (Seminar, 2 SWS)  
Osmani V, Schederecker F

Advanced Statistics (Vorlesung, 2 SWS)  
Schauberger G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### POL40300: Computational Methods | Computational Methods

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module grade is based on an exercise in the form of a test. The test will assess to which extent students understand essential elements of different computational methods and whether they are able to apply this knowledge in a limited timeframe.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

#### Content:

Nowadays, we are surrounded by data. Almost every service we use is driven by and collects data. This era of datafication leads to new approaches to analyze complicated data that can have important implications for social science. This course teaches students new directions of methodology to better use large datasets. Furthermore, students will discuss ethical challenges, such as transparency and accessibility of data.

#### Intended Learning Outcomes:

Upon successful completion of this module, students will have a foundational understanding of computational methods and will further be able to apply this knowledge independently on an inter- and transdisciplinary basis. Furthermore, students will have (1) a foundational knowledge about theoretical concepts and methodologies used in computational political science; (2) sufficient knowledge about the strengths and weaknesses of different computational methods, to be able to: (2a) critically understand and evaluate the methods used in computational social science research; (2b) design simple research projects based on computational social science methods by themselves; and (3) enables students with methodological skills to collect and analyze political

science data computationally as well as to report findings from simple computational political science projects.

**Teaching and Learning Methods:**

This module consists of the lecture "Computational Methods" (2 SWS) and an accompanying tutorial (2 SWS). The lecture provides foundational knowledge through presentations and slides. The tutorial enables the discussion and application of the lecture contents in a smaller group setting, in preparation for the written exam.

**Media:**

Scientific literature, slides, tutorial

**Reading List:**

Alvarez, R. (Ed.). (2016). Computational Social Science: Discovery and Prediction (Analytical Methods for Social Research). Cambridge: Cambridge University Press. doi:10.1017/CBO9781316257340

Grimmer, J., & Stewart, B. M. (2013). Text as Data: The Promise and Pitfalls of Automatic Content Analysis Methods for Political Texts. *Political Analysis*, 21(3), 267–297.

In addition, a reader of additional seminar texts will be made available at the start of the semester.

**Responsible for Module:**

da Conceicao-Heldt, Eugenia; Prof. Dr. phil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

(POL40300) Computational Methods (Exercise) (Übung, 2 SWS)

Gad N ( Müller T )

(POL40300) Computational Methods (Lecture) (Seminar, 2 SWS)

Gad N ( Müller T )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20230: Ethics and Responsibility | Ethik und Verantwortung

Version of module description: Gültig ab summerterm 2014

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 30	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einem Referat (1500-200 Wörter) oder einer Präsentation (15-20 Min.) stellen die Studierenden eine Methode ethischer Urteilsbildung für mögliche Konfliktszenarien in den Problemfeldern Wissenschaft und Technik vor (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Wir treffen täglich Entscheidungen. Dabei spielen Fakten eine große Rolle, oft aber auch das sogenannte Bauchgefühl. In gesellschaftlichen Debatten um brisante Anwendungen von Wissenschaft und Technik kommt viel darauf an, beides voneinander zu unterscheiden und vor allem gute Gründe pro oder contra zu finden. Ethik leitet dazu an, mit Konflikten verantwortlich umzugehen. Aber welche Art von „Wissen“ wird dabei eingesetzt? Wie verhalten sich Recht und Ethik zueinander? Und wie lässt sich über angewandte Ethik sprechen, ohne Moral zu predigen?

#### Intended Learning Outcomes:

Die Studierenden sind in der Lage mithilfe einer Methode ethischer Urteilsbildung exemplarische Konfliktszenarien auf den Problemfeldern von Wissenschaft und Technik zu beschreiben und abzuschätzen. Nach der Teilnahme am Seminar sind sie in der Lage, ethische Argumente im Hinblick auf ihre Geltungsansprüche zu unterscheiden und verantwortliche Handlungsoptionen in verständlicher und zugleich anwendungsnaher Sprache für ein ethisches Gutachten reflektiert aufzubereiten.

**Teaching and Learning Methods:**

Präsentation, Referat, Diskussion, Textanalyse

**Media:**

**Reading List:**

Fritz Allhoff, What Are Applied Ethics? <http://files.allhoff.org/research/>

What\_Are\_Applied\_Ethics.pdf

Lee Archie, John G. Archie, Introduction to Ethical Studies An Open Source Reader, <https://philosophy.lander.edu/ethics/ethicsbook.pdf>

John Deigh, An Introduction to Ethics, <http://dx.doi.org/10.1017/CBO9780511750519.002>

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Ethics of Responsibility: An Introduction to Applied Ethics (Core Topic MA STS) (Seminar, 2 SWS)  
Wernecke J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA21005: Introduction to Diversity Management | Einführung in Diversity Management

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 45	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einer Kurzpräsentation und einer schriftlichen Ausarbeitung zeigen die Studierenden die Bedeutung von Diversity in Organisationen auf. Sie reflektieren welche Möglichkeiten und Herausforderungen durch Diversity Management geschaffen werden können (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Diversity Management und Diversity Kompetenz sind für Organisationen zu zentralen und notwendigen Aufgaben geworden.

Die Etablierung einer Wertschätzungskultur, Chancengleichheit und die Förderung kreativer und innovativer Lösungsansätze sind wesentliche Ziele des Diversity Managements: Wie kann ich mit der passenden Kombination von Vielfalt das Optimum für ein Projekt oder eine Veranstaltung herausholen? Der gelungene Umgang mit Diversity hängt nicht nur von persönlichen Fähigkeiten und Handlungsoptionen ab, sondern auch von der Kompetenz sich auf Unterschiedlichkeiten eines Teams, wie ethnische Herkunft, Hautfarbe, sexuelle Identität, Alter, Geschlecht, Religion und Behinderung einzustellen. Auch institutionelle Voraussetzungen (AGBs und Rechtsrahmen, kulturell-religiöse Vorgaben, Willkommenskultur etc.) wirken sich darauf aus.

Folgende Themen werden behandelt:

- Diversity-Management-Theorie
- Beispiele für Rahmenbedingungen an Universitäten, Unternehmen und Institutionen in unterschiedlichen Ländern

- Reflexion eigener Vielfalt, Kooperations- und Abgrenzungsmechanismen
- Gemeinsame Erstellung eines TUM Diversity Magazins mit Artikeln zu Theorie und Praxis von Diversity Kompetenz in Wirtschaft und Wissenschaft.

**Intended Learning Outcomes:**

Nach erfolgreicher Teilnahme am Workshop verstehen die Studierenden die Grundlagen des Diversity Managements und sind für das Thema sensibilisiert. Sie können demonstrieren wie man Diversity in Organisationen schafft und sie können persönliche Stereotypen erkennen. Die Studierenden lernen die praktische Recherche und daraus resultierend die Veröffentlichung eigener Artikel.

**Teaching and Learning Methods:**

Anhand von theoretischen Inputs, Übungen und Gruppenarbeit wird in die Thematik des Diversity Management eingeführt.

Reader und ergänzende Literatur; Rollenspiel; Erfahrungsaustausch, Diskussion und Reflexion; kollegiales Feedback.

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Diversity Kompetenz (Online-Workshop und interaktives Lernprojekt) (Workshop, 1 SWS)

Fänderl W, Quindeau A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### IN9017: Entrepreneurship | Existenzgründung

Version of module description: Gültig ab winterterm 2011/12

<b>Module Level:</b> Bachelor	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 4	<b>Total Hours:</b> 120	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

With a scientific elaboration (5 - 10 pages) the students prove that they understand the structure and the logic of the business plan and are able to develop a business idea and to use the results and contributions of the discussions for this development. In the final presentation (20 min.) the students show that they are able to present the business idea in a compact and conclusive way.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

keine

#### Content:

1. Corporation Law
2. Financing
3. Intellectual Property /Patents
4. Tax Law
5. Marketing and Sales
6. Business Plan Preparation

#### Intended Learning Outcomes:

After participation, the students will know the essential principles of setting up a company and will be familiar with the basics of creating a business plan. They can develop a (real or fictitious) business idea with the help of the business plan until it is ready to be founded. They are able to explain the business idea and the central aspects of the business plan to an audience in a compact and understandable way.

**Teaching and Learning Methods:**

First, the basic topics are presented by the lecturers and discussed in the seminar. Thereafter, the participants develop their own business ideas in groups. These ideas are discussed in the group with the lecturers and presented and discussed in a further development step in the plenum. At the final presentation, external experts will also be present and discuss the result.

**Media:**

Presentation with slides

**Reading List:**

Handbook Business Plan Creation of the Munich Business Plan Competition

**Responsible for Module:**

Gerndt, Hans Michael; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Seminar - Existenzgründung (IN9017) (Seminar, 2 SWS)

Gerndt H

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ04043: English - English in action - What is Art? from B2 | Englisch - English in action - What is Art? ab B2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Performance, testing the learning outcomes specified in the module description, is examined by a cumulative portfolio of competence and action-oriented tasks. A presentation (including visual aids, 30%); Writing assignments (40%); A final written examination (30%) in which students prove they can express themselves clearly and concisely.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Ability to begin work at the C1 level of the GER as evidenced by a score in the range of 60 – 80 percent on the placement test at [www.moodle.tum.de](http://www.moodle.tum.de). (Please check current announcements as the exact percentages may vary each semester.)

#### Content:

In this module grammatical forms are reviewed and practiced with a focus on topics of interest to students preparing for their further studies and a professional life in areas requiring a keen awareness of the conventions of art and art history. A key component is the requirement for student autonomy and collaboration within the framework of the module, which includes opportunities for students to practice both written and oral communication needed in academic and professional life. Emphasis is placed on developing strategies for continued learning.

#### Intended Learning Outcomes:

After completion of this module students will possess an awareness of English language public speaking conventions and will be able to put them into practice. In terms of their writing, they will improve their ability to present content clearly and succinctly taking readers' needs and writing conventions into consideration.

**Teaching and Learning Methods:**

Communicative and skills oriented treatment of topics with use of group discussion, case studies, presentations, writing workshops, listening exercises, and pair work, etc. to allow students to effectively communicate as future professionals in their field.

**Media:**

Printed materials, use of online learning platform such as [www.moodle.tum.de](http://www.moodle.tum.de), presentations, film viewings and visits to art museums.

**Reading List:**

Handouts.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Englisch - English in Action - What is art? ab B2 (Seminar, 2 SWS)

Balton-Stier J

For further information in this module, please click [campus.tum.de](http://campus.tum.de) or [here](#).

## Module Description

### SZ0406: English - Writing Academic Research Papers C2 | Englisch - Writing Academic Research Papers C2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b>	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Performance, testing the learning outcomes specified in the module description, is examined by a cumulative portfolio of competence and action-oriented tasks. These include a 350-word abstract for an academic research paper (15%); a 15-minute oral “academic-conference-style” presentation of research and findings (35%); and complete an academic research paper of up to 5,000 words including references (APA/MLA style, 50%), in which they demonstrate an ability to critically engage in academic discourse, making use of rhetorical devices and conventions appropriate for their audience. The major assignment is based on multiple iterations of the academic research paper on which critical feedback has been given by the instructor.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Ability to begin work at at least the C1 level of the GER as evidenced by a score in the range of 60 – 80 percent on the placement test at [www.moodle.tum.de](http://www.moodle.tum.de). (Please check current announcements as the exact percentages may vary each semester.)

#### Content:

This is a process writing course during which students will study effective organization of written academic English incorporating discourse markers, topic sentences, and good paragraphing; study effective use of rhetorical structures appropriate to academic English: e.g. theme and rheme, nominalisation, use of passive, as well as register and style appropriate to target audience; and choose a topic commensurate with their interests/area of study and produce an abstract, a presentation and an academic research paper with the support of peers and tutor.

**Intended Learning Outcomes:**

**Teaching and Learning Methods:**

Students will:

- a) Research a topic and gather information pertinent to a self-chosen thesis/research question
- b) Prepare a presentation outlining their chosen research question or thesis which they will have to defend orally
- c) Work on their chosen topic with tutor support and regular tutorials

The tutor will:

- a) Give short input presentations with accompanying language based activities (pair work, group work) at the beginning of each sessions in the first half of the course
- b) Give regular tutorial support

**Media:**

Powerpoint presentations (student and lecturer generated); Audio and visual recordings from a variety of sources; printed handouts.

**Reading List:**

Handouts and selected extracts from published sources will be used in the course. Key literature will be advised by the teacher and/ or listed in the course description.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Englisch - Writing Academic Research Papers C2 (Seminar, 2 SWS)

Hughes K, Sanchez D

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0453: English - Scientific Presentation and Writing C2 | Englisch - Scientific Presentation and Writing C2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b>	<b>Self-study Hours:</b>	<b>Contact Hours:</b>

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Performance, testing the learning outcomes specified in the module description, is examined by a cumulative portfolio of competence and action-oriented tasks. An oral presentation including a handout and visual aids (25%), written assignments (50%), and a final exam (25%) contribute to the final course grade. Students are expected to complete a presentation, an argumentative research essay, five forum entries, and a final exam for the final grade.

As the course may be offered in various formats (online or classroom) the form and conditions of the final exam (with or without aids) will vary. Where audio or video is recorded, we observe the Basic Data Protection Regulation (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Ability to begin work at the C2 level as evidenced by a placement test score in the range of 80 – 100 percent. (Please check current announcements as the exact percentages may vary each semester.)

#### Content:

This course allows students to practice for formal speaking tasks in English such as a class presentation, dissertation defense or conference talk, and for completing formal written tasks such as a journal article, report, project proposal or a literature summary.

#### Intended Learning Outcomes:

After completion of this module students can understand with increased ease virtually everything heard or read; they can summarize information from different spoken and written sources,

reconstructing arguments and accounts in a coherent presentation, and they can express themselves spontaneously very fluently and precisely, differentiating finer shades of meaning even in more complex situations.

Corresponds to C2 of the CER.

**Teaching and Learning Methods:**

Techniques for evaluating one's own presenting and writing will be practiced, with opportunities to revise drafts. Oral and written peer evaluations will form a regular component of the class sessions including use of an online peer forum and online instructor feedback.

**Media:**

Course handouts, online platform

**Reading List:**

Handouts and selected extracts from published sources will be used in the course. Key literature will be advised by the teacher and/ or listed in the course description.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Englisch - Scientific Presentation and Writing C2 (Seminar, 2 SWS)

Field B, Hughes K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SZ0454: English - Basic English for Scientific Purposes B2 | Englisch - Basic English for Scientific Purposes B2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Performance, testing the learning outcomes specified in the module description, is examined by a cumulative portfolio of competence and action-oriented tasks. Grades for an oral presentation (including a handout and visual aids, 25%) , multiple drafts of two assignments to allow students to develop written skills by means of a process of drafting and revising texts (25% each assignment), and a final written examination (25%) contribute to the final course grade.

As the course may be offered in various formats (online or classroom) the form and conditions of the final exam (with or without aids) will vary. Where audio or video is recorded, we observe the Basic Data Protection Regulation (DSGVO, Art. 12 -21).

#### Repeat Examination:

#### (Recommended) Prerequisites:

B2 level according to the online placement test

#### Content:

This course enables students to practise scientific and technical English through active group discussions and delivery of subject-related presentations.

#### Intended Learning Outcomes:

On completion of this module/course students will have expanded their knowledge of vocabulary related to science and technology. The student's reading, writing and listening skills as well as oral fluency will improve.

Students will develop an awareness of Anglo-American public speaking conventions and will be able to put these into practice. In written and spoken contexts they will be able to differentiate accurately between situations requiring formal or familiar registers and select the correct form. Further, they will improve their ability to present content clearly and succinctly taking readers' needs and writing conventions into consideration.

Corresponds to B2 of the CER.

**Teaching and Learning Methods:**

This course involves pair-work and group-work enabling students to develop their verbal and written skills in scientific and technical environment.

**Media:**

Internet sources, handouts contributed by course tutor/students, e-learning platform

**Reading List:**

Internet articles, Journals such as Nature and Scientific American

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Englisch - Basic English for Scientific Purposes B2 (Seminar, 2 SWS)

Hanson C, Owens M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SZ0471: English - Intensive Thesis Writers' Workshop C2 | Englisch - Intensive Thesis Writers' Workshop C2

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Performance, testing the learning outcomes specified in the module description, is examined by a cumulative portfolio of competence and action-oriented tasks. Students' thesis-writing ability will be assessed based on their demonstration of clear improvements over the course of the workshop, showing that an effort has been made to implement the material discussed in class and the individual consultations with the instructor.

#### Repeat Examination:

#### (Recommended) Prerequisites:

For students currently writing theses or dissertations in English. Ability to begin work at the upper C1 or C2 level of the GER, as demonstrated by a score above 75% on the English placement test at [www.moodle.tum.de](http://www.moodle.tum.de). Basic understanding of grammatical terms (e.g., parts of speech, subject, verb, object, active, passive, nominalization).

#### Content:

This course is aimed at students currently writing theses or dissertations. It combines group seminars with individual consultations. All sessions go beyond mere questions of "correct" grammar and word choice and emphasize instead stylistic guidelines for compelling and clear English writing at a high academic level. Discussions have a slight emphasis on strategies for German speakers but are appropriate to students from any language background. The individual sessions are tailored to the needs of each student.

#### Intended Learning Outcomes:

After completion of this module, students will be able to express themselves with greater clarity and precision in written English. They will become more familiar with strategies for effective

academic writing in English specifically, while gaining a sense for potential contrasts with their own native languages. Students will develop techniques to implement compelling sentence constructions, create cohesion within and between sentences, and render paragraphs coherent through specific semantic and syntactic choices.

Corresponds to C2 of the CER.

**Teaching and Learning Methods:**

Seminars adopt a communicative and skills-oriented approach through group discussion, case studies, presentations, group work, etc. Individual sessions use students' texts as the primary learning materials.

**Media:**

Handouts, presentations, audio-visual material, students' own texts.

**Reading List:**

Handouts and selected extracts from published sources will be used in the course. Key literature will be advised by the teacher and/ or listed in the course description.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Blockkurs Englisch Intensive Thesis Writers' Workshop C2 (Seminar, 2 SWS)  
Wellershausen N

Englisch - Intensive Thesis Writers' Workshop C2 (Workshop, 2 SWS)  
Wellershausen N

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### **POL65101: Global Health (MSc.) | Global Health (MSc.)**

*Part 1: Introduction to Global Health, Part 2: Gender Disparities in Health and Development*

Version of module description: Gültig ab summerterm 2020

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### **Description of Examination Method:**

The examination consists of a research paper ("Policy Brief", approx. 6-7 pages), which tests students' ability to identify key challenges of global health in a selected country and develop evidence-based policy recommendations to promote population health in the given context. A

As part of a mid-term examination, students may voluntarily hold a 15-20 minute presentation discussing and critically evaluating a selected empirical paper. In this presentation, students demonstrate their competence in applying basic concepts of the Global Health discipline and interpreting and critically appraising relevant empirical studies. Successful completion of the mid-term will lead to a +0.3 bonus on the final grade.

#### **Repeat Examination:**

Next semester

#### **(Recommended) Prerequisites:**

Quantitative methods

#### **Content:**

The module provides a general introduction to the global health discipline, whereby specific focus is placed on developments and processes in countries of the Global South. The first part (seminar 1) defines the global health discipline in relation to other disciplines such as public health and epidemiology, introduces basic concepts and terms, and sheds light on associations between health and development. Further, it discusses trends in the global burden of disease and critically appraises different approaches to the measurement of disease. Lastly, the seminar discusses various intervention strategies on a policy- and individual level and evaluates their theoretical foundations and empirical evidence. The second part (seminar 2) looks at health and development

through a gender lens. It first discusses different approaches to the measurement of (gender) inequality and covers various additional topics, including Amartya Sen's theory on "Missing Women" as well as related empirical studies, differences between matrilineal and patrilineal societies, fertility and reproductive health, and gender-based violence.

**Intended Learning Outcomes:**

Upon successful completion of the module, students are able to define basic concepts and terms of the global health discipline. Moreover, students are able to reflect on trends in the spread and global prevalence of important communicable and non-communicable disease as well as comment and criticise strategies for their prevention or treatment. In addition, students are able to explain macro-relationships between poverty and health, and assess the impact of various health interventions and policies. Lastly, students can summarise, interpret, and assess the findings of influential empirical studies.

**Teaching and Learning Methods:**

The module consists of two seminars. The first seminar ("Introduction to Global Health", 2 SWS) is focused on the theoretical and conceptual foundations of the discipline and introduces key topics and empirical papers on global health. The second seminar ("Gender Disparities in Health and Development", 2 SWS) provides a more in-depth discussion of global health and development topics with a focus on gender. The module is taught in a combination of teacher-centered lectures, interactive discussions, student presentations, and occasional group work.

**Media:**

multimedia-supported

**Reading List:**

Skolnik, R. (2019). Global health 101 (3rd or 4th Edition). Jones & Bartlett Publishers.

**Responsible for Module:**

Steinert, Janina; Prof. Dr. phil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

(POL65101) Global Health (MSc.) (Introduction to Global Health and Gender Disparities)  
(Seminar, 4 SWS)

Steinert J ( Gruschwitz B )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI001122: Introduction to Business Law (MiM) | Introduction to Business Law (MiM) [BusLawMiM]

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The final assessment will be held as a written exam of 120 minutes. The exam consists of two parts which count for approximately 50 per cent each and forming the overall mark.

In the first part of this exam, students will be asked theoretical questions. This will demonstrate to what extent they have memorized and understood principles of the law of contracts, torts, company law, IP and competition law. In the second part, students will also be asked to apply their knowledge to known and fictional cases. This demonstrates if students have developed the required legal analytical skills. Students also need to demonstrate their ability to apply their knowledge to fact settings not discussed in the lecture, and to evaluate the legal consequences.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

This module covers the legal essentials of running a business in technology driven markets in Germany and in the European Union. It focuses on typical problems which entrepreneurs and employees might encounter in practice (scenario-based approach). Topics covered will be, inter alia, the formation and termination of contracts, selected types of contract (in particular, sale of goods), torts, property law, the law of business associations, intellectual property law, competition law.

#### Intended Learning Outcomes:

At the end of this module students will be able

- (1.) to name and understand essentials of the legal framework for technology oriented businesses in Germany and in the European Union;
- (2.) to identify and avoid the problems presented by dealing with legal issues in a foreign language (in particular, English as the main business language) and/or in a transnational setting;
- (3.) to grasp and apply the legal principles regulating business activity, in particular regarding liability under tort, contract, company, intellectual property and competition law;
- (4.) to analyse legal implications of typical business situations and to identify their options;
- (5.) to present the results of their analysis in a written analysis.

**Teaching and Learning Methods:**

The lecture will cover the theoretical aspects of the module in a discussion with the lecturer. The exercise will focus on case studies. It will provide the opportunity to work individually or in groups on case scenarios (known and unknown), covering various issues of German and European law. The purpose is to repeat and to intensify the content discussed in the lecture and to review and evaluate legal issues from different areas of law in everyday situations. Students will develop the ability to present these findings in a concise and well-structured written analysis.

**Media:**

Presentations (PPT), Cases

**Reading List:**

Gerhard Robbers, "An Introduction to German Law", 6th edition 2016;  
additional reading material will be made available on the course Moodle site prior to the start of the semester.

**Responsible for Module:**

Maume, Philipp; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Introduction to Business Law (WIHN1122) MIM Heilbronn - Exercise (Übung, 2 SWS)

Haag A

Introduction to Business Law (WIHN1122) MIM Heilbronn - Lecture (Vorlesung, 2 SWS)

Jung S, Rolsing N

Introduction to Business Law (WI001122): Exercise (Repetition) (MiM) (Übung, 2 SWS)

Katopodi E

Introduction to Business Law (WI001122, englisch) (MiM) (Vorlesung, 2 SWS)

Maume P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### POL70045: Master Seminar Business Ethics | Masterseminar Wirtschaftsethik

Version of module description: Gültig ab summerterm 2015

<b>Module Level:</b> Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 30	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Prüfungsleistung wird in Form einer 45-minütigen Präsentation während des Seminars erbracht, die außerdem zu verschriftlichen ist. Durch die Präsentation wird überprüft, ob die Studierenden in der Lage sind die erarbeiteten Inhalte innerhalb kurzer Zeit ihren Zuhörern überzeugend zu vermitteln. Durch im Anschluss stattfindende Diskussion wird außerdem die Kritik- und Reflexionsfähigkeit der Teilnehmer geschult. Die Verschriftlichung dient der Einübung stringenten schriftlichen Argumentierens sowie des Umgangs mit wissenschaftlichen Quellen. Präsentation und Verschriftlichung werden jeweils einzeln benotet und fließen mit 75 % (Präsentation) und 25 % (Verschriftlichung) in die Bewertung ein.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Vorlesung "Einführung in die Wirtschaftsethik" (BSc)

#### Content:

1. Vorstellung aktueller Probleme der Wirtschaftsethik; 2. Diskussion methodischer Innovationen auf dem Gebiet der Wirtschaftsethik; 3. Kritische Auseinandersetzung mit verbreiteten Vorurteilen über die Marktwirtschaft; 4. Einübung konsistenter ethischer Argumentation im Rahmen von Rollenspielen; 5. Sensibilisierung für den naturalistischen Fehlschluss; 6. Erläuterung der Bedeutung empirischer Ergebnisse für die Wirtschaftsethik; 7. Schulung der Diskurskompetenz; 8. Entwicklung der Sozialkompetenz; 9. Entwicklung der Kritikfähigkeit; 10. Erwerb von Präsentationstechniken.

**Intended Learning Outcomes:**

Nach erfolgreichem Abschluss dieses Kurses sind die Studierenden in der Lage aktuelle Probleme der Wirtschaftsethik in einen theoretischen Rahmen einzuordnen und innerhalb dieses Rahmens konsistent zu argumentieren. Im Einzelnen können die Studierenden (1) konkrete Fallstudien in einen abstrakten wirtschaftsethischen Rahmen einordnen, (2) im Bereich der Wirtschaftsethik grundlegende Probleme reflektieren, die sich insbesondere auch durch das kritische Hinterfragen der eigenen Position auszeichnet, (3) eigene theoriebasierte wirtschaftsethische Überlegungen systematisieren und verschriftlichen.

**Teaching and Learning Methods:**

Das Masterseminar ermöglicht eine kritische Auseinandersetzung mit aktuellen wirtschaftsethischen Themen in Kleingruppen. Dabei wird insbesondere die Diskussionskompetenz der Teilnehmer geschult und deren Präsentationstechniken verbessert. Durch die Anfertigung einer Präsentation und die Zusammenfassung von deren Kernaussagen wird die stringente Verschriftlichung des eigenen Gedankengangs und dessen Einbindung in die existierende wissenschaftliche Literatur eingeübt. Mit der Hilfe von Liveexperimenten und Gedankenexperimenten erfahren die Studierenden ethische Dilemmata persönlich. Dies dient unmittelbar der Vorbereitung auf die Anfertigung der Masterarbeit.

**Media:**

Präsentationen, Handzettel, Gruppenarbeiten, Gedankenexperimente, Liveexperimente

**Reading List:**

Homann, Karl; Lütge, Christoph: Einführung in die Wirtschaftsethik, LIT Verlag, 3. Auflage

**Responsible for Module:**

Lütge, Christoph; Prof. Dr. phil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

(POL700450) Masterseminar Wirtschaftsethik (Current Topics in Business Ethics) (Seminar, 2 SWS)

Lütge C, Pires Bernardo Ramos Fontes A

(POL700450) Masterseminar Wirtschaftsethik (Current Topics in Business Ethics) (Seminar, 2 SWS)

Lütge C, Pires Bernardo Ramos Fontes A

(POL700450) Masterseminar Wirtschaftsethik (Current Topics in Business Ethics) (Seminar, 2 SWS)

Lütge C, Pires Bernardo Ramos Fontes A

(POL700450) Masterseminar Wirtschaftsethik (Current Topics in Business Ethics) (Seminar, 2 SWS)

Lütge C, Pires Bernardo Ramos Fontes A



(POL700450) Masterseminar Wirtschaftsethik (Current Topics in Business Ethics) (Seminar, 2 SWS)

Lütge C, Pires Bernardo Ramos Fontes A

(POL700450) Masterseminar Wirtschaftsethik (Current Topics in Business Ethics) (Seminar, 2 SWS)

Lütge C, Pires Bernardo Ramos Fontes A

(POL700456) Masterseminar Wirtschaftsethik (Corporate Social Responsibility) (Seminar, 2 SWS)

Thejls Ziegler M ( Max R )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1550: Mathematics for Economics | Mathematics for Economics

Version of module description: Gültig ab summerterm 2016

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

There will be a written exam of 90 minutes at the end of the semester, where students demonstrate their ability to solve problems of mathematical economics on their own. The questions in the exam are based on the contents and exercises discussed in the lecture. Students are allowed to use non-programmable calculators and a formulary issued by the chair.

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

High School-level analysis and algebra

#### Content:

- Basics of Mathematical Economics
- Equilibrium Analysis in Economics
- Linear Models and Matrix Algebra
- Comparative Statics, Derivatives and Rules of Differentiation
- Logarithmic and Exponential Functions
- Optimization with one and more Choice Variables and with Equality Constraints

#### Intended Learning Outcomes:

Upon successful completion of the course, the students will be able to analyze and understand problems of mathematical economics on their own. Students will understand models and mathematical notation in scientific publications in the field of economics.

#### Teaching and Learning Methods:

Lectures will be assisted by PowerPoint presentations in order to explain the theoretical concepts behind the methods discussed. Theory will be illustrated by example exercises given by the

lecturers on the whiteboard. Additionally, a great part of the lectures will be allocated to exercising, where students can practice exercises under the supervision and with the help of the lecturers. Also, participants will be provided with exercises that can be done as a homework in order to deepen their routine in solving problems of mathematical economics.

**Media:**

PowerPoint, whiteboard

**Reading List:**

Chiang, A. C.; Wainwright, K. (2005): Fundamental Methods of Mathematical Economics, 4th edition, McGraw-Hill.

**Responsible for Module:**

Johannes Sauer jo.sauer@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Lecture and exercise combined

Mathematics for Economics

4 SWS

Schickramm, Lena; Frick, Fabian

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CIT3640001: Sanitätsausbildung | Sanitätsausbildung

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 15	<b>Contact Hours:</b> 75

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Das Erreichen der Lernergebnisse wird in einer benoteten, schriftlichen Prüfung ohne Hilfsmittel mit einem Umfang von 60 min geprüft. Die schriftliche Prüfung macht 40% der Abschlussnote aus. Voraussetzung für die Teilnahme an der schriftlichen Abschlussprüfung ist die erfolgreiche Absolvierung praktischer Leistungskontrollen zur Patientenversorgung sowie zur Reanimation im Kursverlauf, diese gehen mit jeweils 30% in die Abschlussnote ein.

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

Vorliegen eines Nachweises über einen aktuellen Erste-Hilfe-Kurs.

#### Content:

Vitalfunktionen, Erkrankungen der Atmung und des Herzkreislaufsystems, Einführung in Aufbau und Funktion des Bewegungsapparates, Versorgung von Wunden und anderen Verletzungen, Versorgung von Sportverletzungen, Erkennen und Versorgen weiterer Erkrankungen (z.B. Herzinfarkt, Schlaganfall, temperaturbedingte Erkrankungen), Reanimation, Rechtliche Rahmenbedingungen im Sanitätsdienst, Vorgehen und Einsatztaktik in der Patientenversorgung

#### Intended Learning Outcomes:

Nach der Teilnahme an dem Modul sind Studierende in der Lage, Notfallpatienten eigenständig zu versorgen. Hierzu notwendiges Wissen über Notfallbilder, Anatomie, Vitalfunktionen und eingesetztes Material kann wiedergegeben werden.

#### Teaching and Learning Methods:

Die Theorieinhalte des Moduls werden überwiegend im Unterrichtsgespräch unter Zuhilfenahme von PowerPoint-Präsentationen und Verschriftlichung an der Tafel erarbeitet, gegebenenfalls

finden auch Gruppenarbeiten statt. Die praktischen Fähigkeiten werden in Übungen sowie Fallbeispielen gefestigt. Kontinuierliche Wissensstandüberprüfungen finden in Form von Moodle-Quizzes statt.

**Media:**

Präsentationen (PowerPoint), Tafel, Fallbeispiele, Moodle-Quiz

**Reading List:**

ausgewählte Gesetzestexte, Videos und Fachartikel (Empfehlungen werden in der Veranstaltung genannt)

**Responsible for Module:**

Hayden, Oliver; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Kurs zum/zur Fachsanitäter\*in (Vorlesung mit integrierten Übungen, 4 SWS)

Göppl M [L], Göppl M, Klüpfel J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### MCTS9001: Social Studies of Data Science & Engineering | Social Studies of Data Science & Engineering

Version of module description: Gültig ab winterterm 2016/17

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The exam will be in written form (mid- or end-of-term paper). Students demonstrate that they have gained deeper knowledge of the political, cultural and social dimensions of producing, storing, processing and using large amounts of data. The students are expected to be able to assess and evaluate social and cultural conditions of data science, to explain social and cultural effects, and to apply relevant theoretical concepts to specific examples.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

#### Content:

Courses in this module can change in focus, but generally focus on selected social, cultural and political dimensions of handling large amounts of data (i.E. data privacy and critical data studies, public discourses on big data, data neutrality, errors, failures, leaks: politics and data regulation, filter bubbles and recommender systems, ethical algorithms) that are contextualized and discussed using basic social and cultural science concepts and positions that are used to reflect on practice-oriented case studies and current public debates.

#### Intended Learning Outcomes:

Learning outcomes are basic concepts and methods for reflexive analysis and for responsibly dealing with social and cultural conditions of working with large amounts of data. The module enables students to understand the political, cultural and social dimensions of producing, storing, processing and using large amounts of data and deduce consequences for dealing with them. Students are enabled to use reflexive knowledge and methods for the systematical production of

reflexive knowledge in their work in data engineering and analytics and to engage in a sensible and responsible way of using big data.

**Teaching and Learning Methods:**

Seminar: Reading and in-class discussion of relevant literature, preparing and holding presentations, inquire and present case studies, group work

**Media:**

The following media are used

- White- or blackboard as well as slides and presentations

- Wikis, Blogs, etc.

**Reading List:**

- Beer, David. 2009. „Power through the Algorithm? Participatory Web Cultures and the Technological Unconscious“. *New Media & Society* 11 (September): 985–1002.
- boyd, danah, und Kate Crawford. 2012. „Critical Questions for Big Data: Provocations for a Cultural, Technological, and Scholarly Phenomenon“. *Information, Communication & Society* 15 (5): 662–79.
- Bunz, Mercedes. 2013. *The Silent Revolution*. Palgrave Macmillan.
- Ensmenger, Nathan. 2012. „Is Chess the Drosophila of Artificial Intelligence? A Social History of an Algorithm“. *Social Studies of Science* 42 (1): 5–30.
- Fuller, Matthew, Hrsg. 2008. *Software Studies: A Lexicon*. Cambridge: MIT Press.
- Gillespie, T. 2010. „The Politics of ‚Platforms‘“. *New Media & Society* 12 (3): 347–64.
- Gillespie, Tarleton. 2012. „Can an Algorithm be Wrong?“ *LIMN IssueNumber 2, Crowds and Clouds*.
- Gillespie, Tarleton. 2014. „The Relevance of Algorithms“. In *Media technologies: essays on communication, materiality, and society*, herausgegeben von Tarleton Gillespie, Pablo J. Boczkowski, und Kirsten A. Foot, 167–93. *Inside technology*. Cambridge, Massachusetts: The MIT Press.
- Kitchin, R. 2014. „Big Data, New Epistemologies and Paradigm Shifts“. *Big Data & Society* 1 (1).
- Kraemer, Felicitas, Kees van Overveld, und Martin Peterson. 2011. „Is There an Ethics of Algorithms?“ *Ethics and Information Technology* 13 (3): 251–60.
- Ramsay, Stephen. 2011. *Reading Machines: Toward an Algorithmic Criticism*. *Topics in the digital humanities*. Urbana: University of Illinois Press.
- Rieder, Bernhard. 2005. „Networked Control: Search Engines and the Symmetry of Confidence“. *International Review of Information Ethics* 3: 26–32.
- Ziewitz, Malte. 2011. „How to think about an algorithm: Notes from a not quite random walk, Discussion paper Symposium „Knowledge Machines between Freedom and Control““. In . *Kulturfabrik Hainburg, Österreich*.

**Responsible for Module:**

Jan-Hendrik Passoth

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### SG8000160: Sponsorship-linked Marketing (Online-course) | Sponsorship-linked Marketing (Online-Kurs)

*vhb-course*

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module examination consists of a written test (60 min.). The exam is to verify that the students are able to properly select and apply appropriate conceptual bases and methodological procedures (within a limited time and without aids) in the light of various challenges of sponsorship. Firstly, the questions include answers to each question from a set of predetermined multiple answers. Secondly, open-end questions are asked so that we can find out whether students are able to demonstrate the use of strategies and implementation steps as part of sponsorship.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic skills in Marketing

#### Content:

- Introduction and Overview of the Sponsorship-linked Marketing Management Process
- Introduction to Sponsorship and Sponsorship-linked Marketing
- The Sponsorship-linked Marketing Management Process
- How Sponsorship-linked Marketing Activities Influence Stakeholders
- The Effects of Sponsorship-linked Marketing Activities on Recipients
- Theories on the Processing of Sponsorship Messages (I)
- Theories on the Processing of Sponsorship Messages (II)
- Visual Attention to Sponsors at the Site of Events and in the Media
- Outcome Measurement and Controlling in Sponsorship-linked Marketing
- Measuring and Interpreting Sponsorship Outcome Variables
- Sponsorship-linked Marketing and the Financial Success of Brands

- Sponsorship-linked Marketing Implementation
- Leveraging Tools in Sponsorship-linked Marketing
- Non-sponsor Brand Behaviors: Official Sponsorship versus Ambush Marketing
- The Sponsor Perspective: How to Create Unique Sponsorship Portfolios
- The Sponsored Property Perspective: How to Recruit and Retain Sponsors

### **Intended Learning Outcomes:**

At the end of the module students understand how sponsorship portfolios are created from the perspective of different stakeholders (sponsors and ambushers, event organizers, individuals, media). This includes sponsorship in sports, arts and culture, social causes, science and education, ecological causes, as well as the media. The students understand the basics in sponsorship and sponsorship-linked marketing, including recent developments and the chain of effects of the sponsorship-linked marketing management process. The students also understand the mechanisms of how recipients process sponsorship messages. They are able to use different methodological concepts in order to quantify the effects of sponsorship messages on recipients and relate these measures to the predefined goals of the stakeholders. The students are able to identify success factors of sponsorship-linked marketing and they can use methods that measure the success of sponsorship. The students are able to create both innovative sponsorship strategies as part of the sponsorship portfolio management and strategies that help sponsors protect the sponsorship rights against ambushers.

### **Teaching and Learning Methods:**

Online lectures that cover the state of the art in the field of sponsorship and its implementation are provided using software technology. Students can access the materials using Internet technology. Learning progress monitoring questions are asked when students go through the content of the class. Students also take part in online training using case studies. They are provided with the relevant material to work on the cases, solve problems, and find solutions. They do so in the form of homework. Answers to the case studies are presented to the students after they have handed in their homework.

### **Media:**

Online lectures

### **Reading List:**

[https://www.researchgate.net/profile/David\\_Woissetschlaeger/publication/317035913\\_Inferred\\_Corporate\\_Motives\\_How\\_Deal\\_Characteristics\\_Shape\\_Sponsorship\\_Perceptions/links/59916244458515b87b4d6b40/Inferred-Corporate-Motives-How-Deal-Characteristics-Shape-Sponsorship-Perceptions.pdf](https://www.researchgate.net/profile/David_Woissetschlaeger/publication/317035913_Inferred_Corporate_Motives_How_Deal_Characteristics_Shape_Sponsorship_Perceptions/links/59916244458515b87b4d6b40/Inferred-Corporate-Motives-How-Deal-Characteristics-Shape-Sponsorship-Perceptions.pdf)

### **Responsible for Module:**

Königstorfer, Jörg; Prof. Dr. rer. oec.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Sponsorship-linked marketing (Online-Kurs) (Seminar, 2 SWS)

Yang Y

Sponsorship-linked marketing (Online-Kurs) (Vorlesung, 2 SWS)

Yang Y

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### ED0151: Philosophy of Technology (Advanced Topics) | Technikphilosophie (vertieft)

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 135	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Das Modul wird mit einer Modulprüfung in Form einer Seminararbeit (3000 Wörter) oder eines Vortrags (35 min) abgeschlossen.

Um die Lernziele zu erreichen, ist neben theoretischem Input und Eigenstudium auch aktive Mitarbeit im Rahmen der Lehrveranstaltung notwendig. Deshalb werden Mid-Term-Leistungen angeboten, die - als Anreiz für die Studierenden - zu einer Verbesserung der Bewertung der Modulprüfung führen können. Mögliche Mid-Term-Leistungen sind: Referat, Gespräch, Protokoll/ Rekapitulation, Essay, Mitarbeit in der Präsenzzeit und in Online-Foren, Übungs-/Hausaufgaben. Art und Umfang der vorgesehenen Mid-Term-Leistungen werden in der Beschreibung der Lehrveranstaltung veröffentlicht.

Alle Einzelleistungen werden benotet. Die Gesamtnote der Mid-Term-Leistungen ergibt sich aus den nach Workload gewichteten Einzelleistungen. Ist diese besser als die Note der Modulprüfung, wird die Gesamtnote aus dem gewichteten Mittel der Modulprüfung und der Mid-Term-Leistungen errechnet. Die Gesamtnote der Mid-Term-Leistungen wird bei der Wiederholung einer nicht bestandenen Modulprüfung berücksichtigt.

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

Modul "Technikphilosophie" (ED0140)

#### Content:

Vertiefende Behandlung von Themen aus dem Modul Technikphilosophie und/oder Erörterung weiterführender Themen unter Berücksichtigung aktueller Entwicklungen.

**Intended Learning Outcomes:**

Die Teilnehmer besitzen vertiefte Kenntnisse über exemplarische Problemfelder und Forschungsdebatten der Technikphilosophie. Sie sind in der Lage, Informationen und Quellen eigenständig aufzubereiten und zu präsentieren. Sie können komplexe Sachverhalte und Argumentationen systematisch analysieren sowie klar und strukturiert vermitteln. Insbesondere entwickeln sie die Fähigkeit, fachspezifisches Wissen in übergreifende Zusammenhänge zu integrieren und interdisziplinär zu vermitteln.

**Teaching and Learning Methods:**

Seminar, Referate, Diskussionen, Selbststudium insbes. eigenständige Erarbeitung eines Themas

**Media:**

Skripte/Reader, Thesenpapiere, Tafelbilder, Power-Point, Literatur zur Lektüre

**Reading List:**

**Responsible for Module:**

Fred Slanitz (slanitz@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### MW2245: Think. Make. Start. | Think. Make. Start. [TMS]

*Build innovative products of your ideas in 10 days!*

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 120

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module examination consists of a project work incl. written documentation (approx. 10 pages) and presentation (10 min), in which the students develop a new product in a group project and present their idea for founding a company on this basis. The individual performance is assessed to what extent the students are able to develop a product with market potential by means of an iterative approach to prototypical implementation. The assessment also includes the ability to work in a team, the ability to make well-founded design decisions and the completeness and conclusiveness of the concept, taking into account social relevance, novelty and innovation. As part of the project work, in addition to documentation, there is a final oral presentation. Through the presentation, students are expected to show whether they can demonstrate their ability to act as a competent team.

#### Repeat Examination:

#### (Recommended) Prerequisites:

The basic requirement is a willingness to engage with new learning methods, approaches, disciplines and ways of working. Cross-role experience in project management, product development (Design Thinking, TRIZ, Systems Engineering, etc), interdisciplinary teamwork, communication skills, creativity and problem solving skills are an advantage. A lot of emphasis is placed on practical experience.

For the "Problem Expert" role, experience in the following areas is an advantage:

- User Testing, Requirements Engineering, Interviewing, Human-Centered Design, Design, Visualisation, Use Case Definition, UX/UI Design, marketing, market research, benchmarking, design thinking.

For the "Tech Developer" role, experience in the following areas is an advantage:

- Hardware (mechanical): design, manufacturing (workshop/makerspace), prototyping, CAD/CAM.
- Hardware (electronic): embedded systems engineering, microcontrollers, sensors/actuators, Arduino, Raspberry, circuitry, board design, metrology, BUS protocols, prototyping, closed-loop/open-loop control, robotics
- Software focus: Backend development, databases, frontend development, machine learning, web development, app development, embedded systems

For the "Business Developer" role, experience in the following areas is an advantage:

- Business Plan/Strategy/Design, Marketing, Sales, Interviewing, Finance & Accounting, Business Law & Regulations, Entrepreneurship.

The number of participants is limited and there will be an application process.

### **Content:**

During the interdisciplinary team project, students work methodically, purposefully and agilely on a development project to develop innovative new products with the intention of successfully launching them on the market. Current needs and problems from social, technological and economic systems are identified, analysed and validated in the interdisciplinary team. In doing so, they cooperatively solve challenges that arise from constraints from the different disciplines. They generate suitable market hypotheses and product ideas at an early stage and interact with initial potential customers/users. They iteratively create prototypes and evaluate their hypotheses with them in experiments.

For more information, visit [www.thinkmakestart.com](http://www.thinkmakestart.com) and [www.tms.tum.de](http://www.tms.tum.de).

### **Intended Learning Outcomes:**

After the successful participation in the module, the students are able to:

- examine the relevance of a problem and develop a solution collaboratively in an interdisciplinary team.
- to discover the innovation potentials of new products / ideas, to evaluate the novelty and social relevance.
- To convert one's own ideas into a Minimum Viable Product and thus use potentials for one's own business start-up.
- To know methods of product development (from thinking to doing), to apply them independently and to evaluate the results (prototyping, design thinking, lean startup, agile, systems engineering).
- to reproduce the principles of user-centred design, to apply them independently and to evaluate them.
- Understand the context of use and analyse customer needs (where do I serve a need and what technology/method do I use).
- To quickly develop important hypotheses involving relevant stakeholders (customer, user, ...) through proper Planning with "purposeful prototyping".
- Change perspectives across disciplines and apply project management in interdisciplinary teamwork.

- To work independently, to make and justify decisions and to learn from one's own mistakes.
- To possibly lay the foundation for one's own business start-up by identifying a start-up idea or team.

**Teaching and Learning Methods:**

"THINK. MAKE. START." is a two-week, practice-oriented, interdisciplinary and competitive teaching format in which students from all faculties can participate (credits are given individually related to the study program). It is organised by the different chairs of TUM, TUM ForTe, and UnternehmerTUM. They get access to the high-tech workshop Makerspace and budget to transform their own ideas into real prototypes (mechatronic products). Learning outcomes are achieved through the following teaching and learning methods:

- Milestones to be achieved, team roles to be held and predetermined course structure provide the roadmap for the project.
- Coaching and teaching expertise in prototyping, business validation, agile development, design thinking, systems engineering, lean startup and user-centred design.
- Teaching the basics of interdisciplinary collaboration through a role concept (Business Developer, Tech Developer, Problem Expert).
- All participants work in interdisciplinary teams (10 teams of 5 students each) and are encouraged to become active themselves and learn through practical experience (hands-on learning).
- Each team pursues a real business idea chosen for the seminar. Special attention is given to really understanding the customer and verifying the solution approach, through questioning, observation, prototyping or expert discussion.
- Using prototyping to bridge the gap between thinking and doing.
- Reflecting on one's own results and approach supports project decisions.
- The teams present their projects to a jury on DemoDay and present the prototypically implemented product ideas to guests from industry, the start-up scene and research.

**Media:**

Project manual, presentations, hand-outs, posters, videos, examples.

**Reading List:**

Esch Franz-Rudolf (2012) Strategie und Technik der Markenführung, 7. Auflage, Vahlen

Faltin, Günter (2008): Kopf schlägt Kapital, Hanser

Halgrimsson (2012): Prototyping and Model Making for Product Design (2012)

Kalweit Andreas, Paul Christof, Peters Sascha, Wallbaum Reiner (2012) Handbuch für Technisches

Produktdesign, Material und Fertigung, Entscheidungsgrundlage für Designer und Ingenieure, 2. Auflage, Springer

Kelly, Tom (2016): The Art of Innovation



Lindemann, U (2007): Methodische Entwicklung technischer Produkte - Methoden flexibel und situationsgerecht anwenden. 2. Auflage

Münchener Business Plan Wettbewerb: Handbuch Businessplan-Erstellung, München  
<http://www.evobis.de/coaching/handbuch/>

Malek, Mirosław / Ibach, Peter K. (2004): Entrepreneurship, Dpunkt Verlag

Moore, Geoffrey A. (2002): Crossing the Chasm, Harpercollins

Osterwalder, Alexander / Pigneur, Yves (2010): Business Model Generation: A Handbook for

Ries, Eric (2011): The Lean Startup

Savoia, Antonio (2019): The right It

Timmons, Jeffrey A. / Spinelli, Stephen (2009): New Venture Creation, 7th edition, McGraw, Hill Professional

UnternehmerTUM (2011): Handbuch Schlüsselkompetenzen, 7. Auflage

**Responsible for Module:**

Zimmermann, Markus; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Think.Make.Start. (Praktikum, 4 SWS)

Zimmermann M [L], Martins Pacheco N, Tong Y, Reif M, Bandle M, Baur C, Thies A, Hohnbaum K, Schmid F, Büchner B

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Carl von Linde-Akademie | Carl von Linde-Akademie

### Module Description

## CLA30267: Communication and Presentation | Kommunikation und Präsentation

Version of module description: Gültig ab summerterm 2014

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

### Description of Examination Method:

In gezielten Präsentationssequenzen zeigen die Studierenden Ihre Souveränität und Überzeugungskraft und erhalten dabei von der Gruppe Feedback (Prüfungsteilleistung 50%). Sie analysieren verschiedene Theorien über förderliche und hinderliche Kommunikations- bzw. Präsentationsweisen in einem kurzen Essay (1000 - 1500 Worte) (Prüfungsteilleistung 50%).

### Repeat Examination:

### (Recommended) Prerequisites:

### Content:

Kommunikation meint in der Regel die dialogische Kommunikation. Gemeinsam werden förderliche und hinderliche Verhaltens- und Kommunikationsweisen anhand der folgenden Inhalte erarbeitet:

- Grundlagen der Kommunikation
- Konstruktives Feedback
- Effektive und zielgerichtete Gesprächsführung

Mit ausgewählten Übungen haben die Studierenden Gelegenheit Ihre Kommunikationskompetenz zu erproben und zu entwickeln.

**Intended Learning Outcomes:**

Nach der Teilnahme sind die Studierenden in der Lage kompetenter zu kommunizieren und wirkungsvoller zu präsentieren. Sie kennen zudem die Inhalte für überzeugende Präsentationsfähigkeit:

- Aspekte der verbalen und nonverbalen Kommunikation
- Aufbau einer Präsentation
- Visualisierung der Inhalte
- Aktivierung der Zuhörer

**Teaching and Learning Methods:**

Ausarbeitung der Präsentationsinhalte (Kurzpräsentation), Präsentationstraining mit Medieneinsatz im Plenum, Einzelarbeit, Gruppenarbeit, Trainerinput, Feedback (mündlich und schriftlich), zusätzliche schriftliche Ausarbeitung (Essay) möglich aber nicht erforderlich.

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Kommunikation und Präsentation - Innenstadt (Workshop, 2 SWS)

Recknagel F ( Brea R ), Zeus R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA21115: Philosophy of Human-Machine Interaction | Philosophie der Mensch-Maschine-Beziehung

Version of module description: Gültig ab winterterm 2014/15

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 38	<b>Contact Hours:</b> 22

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Studierenden bereiten eine Präsentation vor (Prüfungsleistung), in welcher sie aufzeigen, dass sie die unterschiedlichen Formen der Mensch-Maschine-Interaktion verstehen.

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Wie können die Interaktionen zwischen Menschen und Maschinen aussehen, wenn Letztere nicht bloße, allein vom Menschen zu steuernde Automaten sind? Welche Interaktionsformen sind – derzeit und in Zukunft – denkbar, möglich und erstrebenswert?

Zentrale Leitfragen des Seminars sind u.a.: Wie kommunizieren und interagieren Mensch und Computer/Maschine? Welche Grade und Modelle von Automatisierung, Kooperation und Autonomie menschlicher und technischer Agenten sind praktisch relevant, welche erkenntnistheoretisch begründbar, welche ergonomisch zu präferieren? Wie wird das Beziehungsgefüge von Mensch und Maschine ethisch bewertet, wie rechtlich normiert?

#### Intended Learning Outcomes:

Nach erfolgreicher Teilnahme am Seminar sind die Studierenden in der Lage, unterschiedliche Formen der Mensch-Maschine-Interaktion zu verstehen. Insbesondere können sie den derzeitig zu beobachtenden Übergang von der Automatisierung zur Mensch-Maschine-Kooperation aus unterschiedlichen Perspektiven (z.B. ergonomisch, epistemologisch, ethisch) analysieren.

**Teaching and Learning Methods:**

Vergleichende Textanalyse und Textinterpretation, wissenschafts- und erkenntnistheoretische sowie ethische Analyse und Bewertung (methodische Elemente: Sprach- und Begriffsanalyse, Hermeneutik/Logik; problem-oriented learning)

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA11123: How to Produce Your Own Videos | Videos selber machen

Version of module description: Gültig ab winterterm 2014/15

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 15	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Studierenden erstellen ein Filmkonzept und zeigen erlernte Fähigkeiten im drehen und schneiden von Filmsequenzen, welche schließlich zu einem Video fertiggestellt werden (Prüfungsleistung, unbenotet).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Auf YouTube werden jede Minute mehr als 100 Stunden Videomaterial hochgeladen. Auch auf klassischen Websites finden sich immer mehr Bewegtbildinhalte. Dank günstiger Consumer- und Handy-Kameras, frei zugänglicher Schnitt-Software und leistungsstarker Computer und Datenleitungen wird es immer einfacher, Videos herzustellen und zu veröffentlichen. Videos sind zu einem etablierten und zeitgemäßen Kommunikationsmittel geworden.

Wie können sich angehende Wissenschaftler diesen Trend zunutze machen? Wie gelingt es, wissenschaftliche Arbeit mit Hilfe von Videos anschaulich darzustellen? Wie kann man seine Botschaft möglichst einfach visualisieren?

Im Workshop werden die grundlegenden Anforderungen an ein erfolgreiches Video definiert: von der Idee zum Konzept, vom Dreh zum Schnitt. An konkreten Projekten erarbeiten die Studierenden ihre eigenen Filme. Der Schwerpunkt liegt dabei auf der inhaltlichen Gestaltung. Es ist den Studierenden freigestellt, welche Kamera und welches Schnittprogramm sie nutzen.

Bitte bringen Sie eine Digitalkamera oder ein Smartphone mit Videofunktion mit.

**Intended Learning Outcomes:**

Nach der Teilnahme sind die Studierenden in der Lage, ein gutes von einem schlechten Video zu unterscheiden. Sie können die Bereiche Konzeptionierung, Kamera und Schnitt anwenden und wissen, wie ein erfolgreiches Video entwickelt wird. Darüberhinaus sind sie in der Lage selbst ein Video zu erstellen, welches professionellen Kriterien an Inhalt, Visualisierung und Sprache folgt.

**Teaching and Learning Methods:**

Erster Tag: Einführung, Vorstellung und Diskussion ausgewählter Video-Beispiele, Praxisübungen mit der Kamera, Erarbeitung von konkreten Video-Projekten

Zweiter Tag: Vorstellung und Analyse der erstellten Konzepte und Videos

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Videos selber machen (Wie Sie mit Bewegtbild sich und Ihre Inhalte besser verkaufen können)  
(Workshop, 1 SWS)

Fuchs M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA10029: Writer's Lab | Writer's Lab

Version of module description: Gültig ab winterterm 2012/13

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 22	<b>Contact Hours:</b> 8

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Studierenden zeigen in einer Textprobe (3-5 Seiten) für das online Lektorat, dass sie korrekte Zitiersysteme, Literaturnachweise und Argumentationsstrukturen umsetzen können (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Ob wissenschaftliche Ausarbeitung, Exposé, oder Artikel in einer Fachzeitschrift: Schreibkompetenz ist ein Erfolgsfaktor. Die erste Sitzung des Workshops führt an das Schreiben und Strukturieren wissenschaftlicher Texte heran. In der Zeit bis zur zweiten Sitzung steht Ihnen die Referentin für ein Feedback zu individuellen Texten per E-Mail zur Verfügung. Die abschließende Sitzung dient dazu, allgemein wiederkehrende Problematiken zu besprechen sowie Tipps zum Sprachstil und Layout zu vermitteln.

#### Intended Learning Outcomes:

Nach der Teilnahme sind die Studierenden in der Lage

- Zitiersysteme zu unterscheiden und Literaturnachweise im eigenen Text formal richtig aufzuschreiben
- unterschiedliche wissenschaftliche Argumentationsstrukturen anzuwenden
- wissenschaftliche Sprache hinsichtlich Stil und Lesbarkeit zu optimieren
- sich in kleinen Gruppen Feedback auf die eigenen Texte zu geben



**Teaching and Learning Methods:**

Dozentenvortrag, praktische Textübungen, individuelles Online-Lektorat

**Media:**

**Reading List:**

Schneider, W. (2010). Deutsch für junge Profis – wie man gut und lebendig schreibt, Berlin: Rowohlt.

Kruse, O. (2007). Keine Angst vorm leeren Blatt. Ohne Schreibblockaden durchs Studium, Frankfurt/New York: Campus.

Esselborn-Krumbiegel, H. (2002). Von der Idee zum Text. Eine Anleitung zum wissenschaftlichen Schreiben, Paderborn u. a.: Schöningh.

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Writer's Lab - Scriptorium (Workshop, ,5 SWS)

Uecker K ( Recknagel F )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA10412: Technical Writing (Engineer Your Text!) | Technical Writing (Engineer Your Text!)

Version of module description: Gültig ab summerterm 2014

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 15	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

For their coursework (=immanent examination), students may choose between writing a short persuasive essay or a proposal (max. 1000 words); alternatively, they may compile a scientific abstract for a (hypothetical) paper (max. 250 words) or their thesis (max. 500 words). It is particularly important that students show sensitivity for different audiences and demonstrate their developed knowledge about argumentational structures in the chosen assignment.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Students require adequate English skills (intermediate to post-intermediate).

#### Content:

Fuel your studies by the alternative energy of this workshop. Maximize your skills to write. Increase your writing efficiency. Use sustainable strategies and quality tools. Learn to write TUM (Technical, Understandable, Manageable) documents.

This course will focus on the fundamentals of text manufacturing: materials, processes, designs, assembly methods, quality management, and performance monitoring.

#### Intended Learning Outcomes:

By the end of the course, you are expected to be able to

- identify the role of psychological factors in writing and reading.
- recognize the needs of different audiences.
- show sensitivity to usability demands.
- analyze technical documents and locate features of best-practice writing.

- organize and manage your own writing.

**Teaching and Learning Methods:**

The workshop uses a constructivist approach to document analysis and text production based on recent academic literacy research. Cooperative learning methods like discussions, small group work, peer review, some direct instruction, and the independent work of the students ensure the diversity of knowledge transfer.

**Media:**

Flipcharts, exercise portfolio, Moodle

**Reading List:**

Gopen, G. D. and Swan, J. A. (1990). The science of scientific writing. American Scientist, 78:57-63. Please access this article in advance at: <http://www.americanscientist.org/issues/feature/the-science-of-scientific-writing>

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Engineer Your Text! (Technical Writing for People Who Want More) (Workshop, 1 SWS)

Balazs A ( Recknagel F )

For further information in this module, please click [campus.tum.de](http://campus.tum.de) or [here](#).

## Module Description

### CLA10512: Getting More Effective - on My Own and in a Team | Effektiver werden - allein und im Team

Version of module description: Gültig ab summerterm 2011

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 23	<b>Contact Hours:</b> 7

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Im Rahmen einer Präsentation zeigen die Studierenden auf wie man in bestimmten Situationen die Effektivität des Einzelnen und des Teams steigern kann (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Wie lange und wie hart man arbeitet, sind keine Erfolgskriterien. Nur Ergebnisse zählen; Ergebnisse in Bezug auf ein gesetztes Ziel.

Der Workshop – bestehend aus drei Teilen – führt die Teilnehmerinnen und Teilnehmer in verschiedene vom Dozenten während seiner langjährigen Industrietätigkeit erprobte Methoden zur Steigerung der Effektivität ein.

Er gliedert sich wie folgt:

- Grundsätzliche Betrachtungen u.a. "effektiv" versus "effizient", "dringlich" versus "wichtig", "Stoppuhr" versus "Kompass"
- Situationsanalyse
- Rollen und Effektivitätsbereiche
- Zielfindung
- (Projekt-)Planung
- Zeitmanagement
- Arbeitsgruppe und Team (u.a. Motivation, Kommunikation, Lernen von Spitzenteams)

- Kontinuierliche Verbesserung

**Intended Learning Outcomes:**

Nach Abschluss sind die TeilnehmerInnen in der Lage,

- ihre Situation methodisch zu analysieren
- ihre jeweiligen "Effektivitätsbereiche" festzulegen
- sich "richtige" Ziele zu setzen und planerisch anzugehen
- die knappe Ressource Zeit besser zu managen
- sich in ein Team erfolgreich einzubringen, ggf. ein solches zu leiten
- Schwachstellen im Team zu erkennen

**Teaching and Learning Methods:**

Interaktive Erarbeitung des Stoffs (Teilnehmerunterlagen werden vorher ausgeteilt)

Vertiefung in Gruppenarbeiten, jeweils mit Präsentation

Erprobung der besprochenen Methoden in den Folgetagen, Erfahrungsaustausch beim nächsten Termin

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Effektiver werden - allein und im Team. Mehr Erfolg an der Hochschule, vor allem später im Berufsleben (Workshop, ,5 SWS)

Feicht E ( Recknagel F )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA10555: Communication and Facilitation in Project Teams | Communication and Facilitation in Project Teams

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 22	<b>Contact Hours:</b> 8

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Students will write a short exam which proves that they understand various aspects of project management and are able to handle team conflicts successfully. Furthermore they are able to apply communication and facilitation skills (exam achievement).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Students require adequate English skills to achieve the expected level of participation.

#### Content:

Team roles and team development stages (team development clock, team triangle)  
 How to create a good and well-structured work environment and enhance collaboration  
 Motivating a team with constructive feedback  
 How to handle conflicts successfully  
 Creative problem solving tools

#### Intended Learning Outcomes:

Here you will gain new insights into your own role within your team and gain appreciation of other roles that may appear during conflicts. By learning better ways of looking at team dynamics you will improve your ability to create a good and well-structured work environment and enhance team collaboration. After completing this workshop you will have an expanded set of useful communication and facilitation skills that will enable you to build good work relationships and deal with conflicts in a constructive manner.

**Teaching and Learning Methods:**

Trainer input, demonstrations, exercises, role-playing games, group discussions, feedback, etc. Each participant is encouraged to explore his/her style and thus expand their individual set of communication, dialogue facilitation and project team collaboration skills.

**Media:**

**Reading List:**

Belbin RM (1993) Team Roles At Work. Butterworth-Heinemann, Oxford

Hanlan M (2004) High-Performance Teams – How to Make Them Work. Praeger, Westport CT.

Pentland A (2012) The New Science of Building Great Teams. In: Harvard Business Review 04:2012.

Waters K (2012) All About Agile: Agile Management Made Easy! CreateSpace Independent Publishing Platform.

West MA (1990) The Social Psychology of Innovation in Groups. In: MA West, JL Farr (Eds) Innovation and Creativity at Work. Wiley, Chichester.

Yukl GA (2013) Leadership in Organizations. 8th ed. Pearson Education, Harlow.

"

**Responsible for Module:**

Monika Thiel

**Courses (Type of course, Weekly hours per semester), Instructor:**

Communication and Facilitation in Project Teams (Workshop, ,5 SWS)

Thiel M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA10716: Positions of Modern Design | Positionen des modernen Designs

Version of module description: Gültig ab summerterm 2002

<b>Module Level:</b>	<b>Language:</b>	<b>Duration:</b>	<b>Frequency:</b>
<b>Credits:*</b> 1	<b>Total Hours:</b>	<b>Self-study Hours:</b>	<b>Contact Hours:</b>

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

#### Intended Learning Outcomes:

#### Teaching and Learning Methods:

#### Media:

#### Reading List:

#### Responsible for Module:



**Courses (Type of course, Weekly hours per semester), Instructor:**

Positionen des modernen Designs: Die Neue Sammlung (Vor Originalen in der Pinakothek der Moderne) (Workshop, 5 SWS)

Rehwagen U

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA10813: Economic Thinking: Economics | Volkswirtschaftlich Denken

Version of module description: Gültig ab winterterm 2010/11

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 15	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einer Präsentation (10-15 Min.) zeigen die Studierenden ihr Verständnis von grundlegenden ökonomischen Zusammenhängen.

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Die berufliche und private Lebenswelt ist zu einem erheblichen Teil durch ökonomische Determinanten und Kalküle bestimmt. Besonders deutlich wird die Wahrnehmung und die Kommunikation ökonomischer Fragen in Krisen.

Ein Ziel der Veranstaltung ist das Erkennen grundlegender ökonomischer Zusammenhänge. Ökonomische Begriffe und Zusammenhänge als fachliche Grundlage volkswirtschaftlichen Denkens und Handelns werden im Workshop anhand folgender Themen erworben:

1. Wirtschaftliches Denken und Handeln
2. Marktwirtschaftliche Ordnungen
3. Markt und Preisbildung
4. Wirtschaftssubjekte
5. Übung
6. Wirtschaftskreislauf
7. Konjunktur und Stabilität
8. Finanzsystem
9. Fallstudie

**Intended Learning Outcomes:**

Nach der Veranstaltung sind die Studierenden in der Lage grundlegende ökonomische Begriffe und Zusammenhänge zu verstehen.

**Teaching and Learning Methods:**

Vortrag, Gruppenübung, Präsentation, Diskussion, Fallstudie

**Media:**

**Reading List:**

**Responsible for Module:**

Karin Aschenbrücker

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA11207: Understanding Art 1: Art Reception in front of Originals in Museums in Munich | Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen

Version of module description: Gültig ab summerterm 2023

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 15	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Prüfungsleistung wird in Form eines Referats (20-30 Minuten) erbracht, in dem die Studierenden ein Kunstwerk beschreiben, analysieren und interpretieren.

#### Repeat Examination:

#### (Recommended) Prerequisites:

keine

#### Content:

Die Seminare thematisieren zentrale Positionen und/oder herausragende Werke im weiten Spektrum von Kunst und Design.

Mögliche Themen und Fragen:

Wie verändert sich das Industrie-, Fahrzeug- oder IT- Design im 20. Jahrhundert? Wie unterscheiden sich Selbstportraits der Renaissance von heutigen Selfies? Brauchen wir Kunst im öffentlichen Raum? Was bedeutet "Slow-Art" oder "phänomenologische Methode"?

Über den kulturhistorischen Kontext hinaus werden exemplarisch aktuelle kulturpolitische sowie kunst- und designtheoretische Diskurse berücksichtigt.

#### Intended Learning Outcomes:

Nach der Teilnahme an der Modulveranstaltung sind die Studierenden in der Lage, ein Kunstwerk oder Designobjekt verständlich zu beschreiben und nachvollziehbar zu interpretieren. Darüber hinaus kennen sie Beispiele von kulturhistorischen Einordnungen.

**Teaching and Learning Methods:**

Beschreibung und Interpretation von Originalen. Diskussion in Münchner Museen und im öffentlichen Raum.

**Media:**

Seminar, Referate, Eigenstudium, Besuch von Ausstellungen

**Reading List:**

**Responsible for Module:**

Slanitz, Alfred; Dr. phil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Kunst vor der Haustür - Der Skulpturenpark im Kunstareal München (Seminar, 1 SWS)  
Rehwagen U

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA11301: Presentation Training with Video Feedback | Präsentationstraining vor der Kamera

Version of module description: Gültig ab summerterm 2015

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> irregularly
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 7	<b>Contact Hours:</b> 23

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einer Präsentation (10-15 Min.) zeigen die Studierenden, dass sie sicher präsentieren können und wissen wie man anhand der Körpersprache überzeugt und wirkungsvoll zu einem Publikum spricht.

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Im Workshop analysieren und üben Studierende, was eine gute Präsentation ausmacht und wie Körpertechnik, Körperhaltung und Sprache für einen bleibenden Eindruck eingesetzt werden können. Anhand von Videoanalysen erhalten die Studierenden konstruktives Feedback.

Präsentationen können auch in englischer Sprache gehalten werden.

#### Themen

- Körpersprachliche und stimmliche Wirkung
- Umgang mit Lampenfieber
- Einsatz von Medien
- Umgang mit Einwänden aus dem Publikum

#### Intended Learning Outcomes:

Nach der Teilnahme sind die Studierenden in der Lage

- sicher und authentisch vor Publikum (und Kamera) aufzutreten

- körpersprachliche Wirkungselemente souverän einzusetzen
- Präsentationen publikumsorientiert und überzeugend zu gestalten

**Teaching and Learning Methods:**

Input, Präsentieren, Video-Feedback

**Media:**

**Reading List:**

**Responsible for Module:**

Bettina Hafner

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA11313: Conflict Management and Conducting Discussions | Konfliktmanagement und Gesprächsführung

Version of module description: Gültig ab summerterm 2015

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 8	<b>Contact Hours:</b> 22

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Studierenden dokumentieren in einem Bericht in Form einer schriftlichen Selbstreflexion (3-5 Seiten) ihr Verständnis des eigenen Konfliktverhaltens in schwierigen Gruppensituationen.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

#### Content:

Wenn Menschen intensiv zusammenarbeiten, ergeben sich immer wieder Situationen, die sie als kontrovers, Stress auslösend und unproduktiv erleben. Durch das Aufeinandertreffen gegensätzlicher Interessen, Verhaltensweisen oder Einstellungen entstehen häufig Auseinandersetzungen, die es den Beteiligten erschweren, die eigentlichen Aufgaben zu erledigen und die angestrebten Ziele und Ergebnisse zu erreichen. Konflikte bergen jedoch auch viele positive Chancen und Veränderungspotenziale.

Der Workshop soll die Teilnehmenden sensibilisieren, Streitsituationen frühzeitig zu erkennen und eine konstruktive Haltung zur Situation einzunehmen. Sie lernen, Distanzfähigkeit zu entwickeln, wo sie selbst in Konflikte verwickelt sind, und ein Gespür für Verhandlungsgeschick entwickeln, wo sie als neutrale Dritte zwischen Kontrahenten vermitteln können. Der Workshop soll schließlich Strategien und (Gesprächs-)Techniken vermitteln, mit denen die Teilnehmenden Konflikte konstruktiv deeskalieren und den nachgelagerten Prozess gezielt steuern und strukturieren können.



**Intended Learning Outcomes:**

Nach der Teilnahme sind die Studierenden in der Lage das persönliche Konfliktverhalten zu verstehen, Konflikte zu erkennen, zu bearbeiten und zu lösen. Die Studierenden kennen die Eskalationsstufen im Konfliktverlauf, wissen, wie sie schwierige Situation ansprechen und zwischen Konfliktparteien moderieren.

**Teaching and Learning Methods:**

Durch theoretischen Input erfahren die Studierenden unterschiedliche Konfliktdefinitionen, die diese im Anschluss praktisch anhand von Rollenspielen und Fallarbeiten in Kleingruppen sowie im Plenum üben können

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Kritische Kommunikationssituationen einfach lösen (Workshop, 1,5 SWS)

Hörtlackner R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA11317: Interdisciplinary Lecture Series Environment: Politics and Society | Ringvorlesung Umwelt: Politik und Gesellschaft

Version of module description: Gültig ab summerterm 2015

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 15	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

A successful accomplishment of 9 academic performances is mandatory for the examination! The examination consists of a short PowerPoint presentation at the end of the semester. The presentation can be created alone or in groups of two. Everyone has to speak one minute. The examination is ungraded.

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

The lecture series Umwelt (environment) is an interdisciplinary, public lecture organised by the Environmental Department of the Studentische Vertretung (Student Representatives) of the TU Munich. Experts speak e.g. on technical environmental protection, health, consumer and climate protection. In the summer semester, it offers students the opportunity to learn about the political and social dimensions of current ecological topics and research results at a scientific level.

The lecture series Umwelt (environment) is offered in the winter semester in the module CLA11200 Ringvorlesung Umwelt: Ökologie und Technik (Lecture series on the environment: ecology and technology). It is only possible to gain given credits twice for the lecture series within each study program.

#### Intended Learning Outcomes:

Students are able to follow expert presentations on political and social dimensions of environmental problems and identify core theses and central facts.

**Teaching and Learning Methods:**

Lectures, presentations, discussions

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Overcoming Obstacles - the Bumpy Road toward Carbon Neutrality (Ringvorlesung Umwelt) - Garching (Vorlesung mit integrierten Übungen, 1,5 SWS)

Fahmy M, Kopp-Gebauer B, Recknagel F, Slanitz A, Zimmermann P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20121: The Sustainability Approach | Leitbild Nachhaltigkeit

Version of module description: Gültig ab winterterm 2007/08

<b>Module Level:</b>	<b>Language:</b>	<b>Duration:</b>	<b>Frequency:</b>
<b>Credits:*</b> 2	<b>Total Hours:</b>	<b>Self-study Hours:</b>	<b>Contact Hours:</b>

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

#### Intended Learning Outcomes:

#### Teaching and Learning Methods:

#### Media:

#### Reading List:

#### Responsible for Module:

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20231: Concepts of Human Being | Mensch und Menschenbilder

Version of module description: Gültig ab winterterm 2007/08

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 45	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einem Essay (Prüfungsleistung: 2500-3500 Wörter) analysieren die Studierenden exemplarisch aktuelle Probleme (z.B. der Optimierung durch Neuroenhancement) im Hinblick auf das damit verbundene Menschenbild. Sie untersuchen und beurteilen die Konsequenzen für die Lebensführung.

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Nicht nur Politik und Ökonomie implizieren eine Vorstellung davon, was der Mensch sei, auch Wissenschaft und Technik prägen Menschenbilder. Im Workshop werden die Dimensionen der menschlichen Grundsituation freigelegt und davon ausgehend Antworten auf die übergeordnete Frage "Was ist der Mensch?" gesucht. Mögliche Themen:

- Entwicklung anthropologischen Denkens: Vom 18. Jahrhundert bis heute
- Kann der Mensch „von der Natur lernen“? (Soziobiologie)
- anthropologische Konstanten (Exzentrizität, Variabilität, Sozialität, Sprache, Bewusstsein etc.)
- Anthropotechnologie: Wie weit kann der Mensch „verbessert“ werden?
- ethische Aspekte: Was kann der Mensch aus sich machen?

#### Intended Learning Outcomes:

Nach der Teilnahme sind die Studierenden in der Lage,

- Dimensionen der menschlichen Grundsituation zu verstehen und auf aktuelle Entwicklungen zu beziehen,
- damit zusammenhängende (ideengeschichtliche) Konzepte über den Menschen einzuordnen,
- Konsequenzen für die (eigene) Lebensführung zu reflektieren und zu beurteilen.

**Teaching and Learning Methods:**

Vortrag, schriftliche Ausarbeitung, Texterschließung, Gruppenarbeit, Diskussion

**Media:**

**Reading List:**

**Responsible for Module:**

Andreas Belwe

**Courses (Type of course, Weekly hours per semester), Instructor:**

Der optimierte Mensch – Ein Ideal und seine Grenze (Workshop, 1 SWS)

Belwe A ( Recknagel F )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20267: Communication and Presentation | Kommunikation und Präsentation

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 30	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Nach der Teilnahme sind die Studierenden in der Lage durch gezielte Präsentationssequenzen (15-20 Min.) Ihre Souveränität und Überzeugungskraft konkret anzuwenden und überzeugend zu demonstrieren (Prüfungsleistung). Eine zusätzliche schriftliche Ausarbeitung (Essay) 5-7 Seiten ist möglich, aber nicht erforderlich.

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Kommunikation meint in der Regel die dialogische Kommunikation. Gemeinsam werden förderliche und hinderliche Verhaltens- und Kommunikationsweisen anhand der folgenden Inhalte erarbeitet:

- Grundlagen der Kommunikation
- Konstruktives Feedback
- Effektive und zielgerichtete Gesprächsführung

Mit ausgewählten Übungen haben Sie Gelegenheit Ihre Kommunikationskompetenz zu erproben und zu entwickeln.



**Intended Learning Outcomes:**

Nach der Teilnahme sind die Studierenden in der Lage kompetenter zu kommunizieren und wirkungsvoller zu präsentieren. Sie kennen zudem die Inhalte für überzeugende Präsentationsfähigkeit:

- Aspekte der verbalen und nonverbalen Kommunikation
- Aufbau einer Präsentation
- Visualisierung der Inhalte
- Aktivierung der Zuhörer

In gezielten Präsentationssequenzen bekommen Sie die Möglichkeit, Ihre Souveränität und Überzeugungskraft konkret zu trainieren und von der Gruppe Feedback zu erhalten.

**Teaching and Learning Methods:**

Ausarbeitung der Präsentationsinhalte (Kurzpräsentation), Präsentationstraining mit Medieneinsatz im Plenum, Einzelarbeit, Gruppenarbeit, Trainerinput, Feedback (mündlich und schriftlich).

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Kommunikation und Präsentation - Innenstadt (Workshop, 2 SWS)

Recknagel F ( Brea R ), Zeus R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20424: Intercultural Encounters | Interkulturelle Begegnungen

Version of module description: Gültig ab winterterm 2002/03

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 38	<b>Contact Hours:</b> 22

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einer Präsentation werden eigene und fremde kulturelle Standards reflektiert und diskursiv mit den anderen Teilnehmern ausgetauscht (Studienleistung). Zudem verfassen die Studierenden ein Lerntagebuch von etwa 5 Seiten, in dem sie die Gefahren von Stereotypisierung und das verbindende Potential interkultureller Begegnungen begründet wiedergeben (Prüfungsteilleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

Gute Deutschkenntnisse (Niveau B2)

#### Content:

Internationale Studierende können sich umso leichter in Hochschule, Gesellschaft und Arbeitswelt integrieren, je mehr Kontakt sie zu ihren deutschen Mitstudierenden haben. Wollen deutsche Studierende im Gegenzug auf dem internationalen Arbeitsmarkt bestehen, so ist der Erwerb interkultureller Kompetenzen unerlässlich.

Die Veranstaltung gibt internationalen und deutschen Studierenden die Möglichkeit, sich ein Semester lang besser kennen zu lernen: Auftakt und Abschluss bilden je ein eintägiger Workshop. Unter Anleitung eines internationalen Trainer/-innenteams werden die Teilnehmenden für andere Kulturen sensibilisiert und reflektieren die eigenen Wertvorstellungen sowie den Umgang mit deutschen und internationalen Mitstudierenden. Im weiteren Verlauf treffen sich die Studierenden bei kulturellen, sportlichen und fachlichen Events wieder und können so ihre Kontakte vertiefen.

#### Intended Learning Outcomes:

Nach der Teilnahme sind die Studierenden in der Lage

- eigene und fremde kulturelle Standards zu reflektieren
- die Gefahren von Stereotypisierung im interkulturellen Kontext zu erkennen

- kompetenter mit kulturellen Unterschieden und möglichen Konfliktsituationen umzugehen

Die Studierenden können Softskills im interkulturellen Bereich umsetzen und bei gemeinsamen Veranstaltungen mit deutschen und internationalen Studierenden praxisnah und anschaulich weiterentwickeln.

**Teaching and Learning Methods:**

Wir verwenden eine methodische Vielfalt aus interaktiven Aufgaben (z.B. Arbeit an Fallbeispielen, Simulationen, Gruppenarbeit) und Kurzvorträgen.

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Intercultural Encounters (Come to Munich - Be at Home!) (Workshop, 1,5 SWS)

Prahl M, Skowron E

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20552: Self-Written, Newly Read - A Literary Writers' Lab | Selbst geschrieben, neu gelesen - Eine literarische Schreibwerkstatt

Version of module description: Gültig ab winterterm 2002/03

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 45	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Kritisches Lesen von sämtlichen Texten wird vorausgesetzt. Studierende stellen eigene literarische Texte in geschützter Öffentlichkeit vor und erhalten kreatives Feedback (unbenotete Studienleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Wer sieht, wer spricht in einem literarischen Text? Die grundlegenden Fragen sind immer einfach, im Leben wie in der Literatur. Doch wer sie genauer prüft, wird erkennen, dass mit diesen Fragen – nach der Perspektive, der Figur und der Sprache – die zentralen ästhetischen wie technischen Grundlagen eines jeden Textes gemeint sind. Sie eröffnen die Welt einer Geschichte und begrenzen ihre Möglichkeiten. Daher soll anhand dieser Themen das Handwerk des Schreibens in Lektüren wie praktischen Übungen erprobt werden.

#### Intended Learning Outcomes:

Eigene literarische Texte werden in einer geschützten Öffentlichkeit vorgestellt. Die Studierenden trauen sich selbst Schreibübungen auszuprobieren um ihre eigenen Stärken und Schwächen klar zu erkennen. Durch das Rückkoppeln an ausgewählte literarische Lektüren verschränken sich Lesen und Schreiben für die Teilnehmer. Am Ende sind die Studierenden in der Lage aus einem wichtigen Terrain der literarischen Moderne und aus diversen praktischen Übungen Impulse für ihre eigene Ausdrucksfähigkeit und den bewussten Umgang mit sprachlichen Mitteln zu holen.

**Teaching and Learning Methods:**

Lesen, Übungen zum Kreativen Schreiben, Verfassen literarischer Texte, Textkritik

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Über Empathie. Eine philosophisch-literarische Denk- und Schreibwerkstatt (Seminar, 1,5 SWS)  
Ammereller E, Lange K

Ist das Kunst oder kann das weg? Es kann weg, denn es ist Kunst (Eine Schreib- und Lektürewerkstatt zur kurzen Form) (Workshop, 1,5 SWS)  
Lange K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20704: Thinking, Perceiving, and Knowing | Denken, Erkennen und Wissen

Version of module description: Gültig ab winterterm 2010/11

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 37	<b>Contact Hours:</b> 23

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Das Modul wird mit einer Modulprüfung in Form eines Vortrags (Präsentation) abgeschlossen. Im Vortrag dokumentieren die Studierenden, dass sie zentrale Grundprobleme der Erkenntnistheorie verstanden haben und veranschaulichen können (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Das Seminar vermittelt einen historisch-systematischen Überblick der europäischen Klassiker der Erkenntnistheorie. Zentrale Fragen und Problemstellung der Erkenntnistheorie von der Neuzeit bis zur Gegenwart werden erarbeitet, zur Diskussion gestellt und bzgl. ihrer Relevanz für gegenwärtige Positionen in Wissenschaft und Gesellschaft eingeordnet.

Themenbereiche:

- neuzeitliche Erkenntnismodelle
- historisch-systematischer Überblick: Empirismus, Rationalismus, Idealismus, linguistic turn, pragmatic turn und naturalisierte Erkenntnismodelle

#### Intended Learning Outcomes:

Die Teilnehmer besitzen Grundkenntnisse über exemplarische Problemfelder der Erkenntnistheorie und verstehen Grundprobleme des Erkennens. Sie sind in der Lage, deren Relevanz für moderne Erkenntnis- und Wissenschaftskonzepte sowie für die Gesellschaft argumentativ einzuordnen.

**Teaching and Learning Methods:**

Vorlesung, textbasiertes Seminar, Referate, Gruppenarbeit, Diskussion, Selbststudium insbes.  
Lektüre / Erarbeitung von Texten

**Media:**

Skripte / Reader, Thesenpapiere, Tafelbilder, Power-Point

**Reading List:**

**Responsible for Module:**

PD Dr. Jörg Wernecke

**Courses (Type of course, Weekly hours per semester), Instructor:**

Denken, Erkennen und Wissen (Eine Einführung in die Erkenntnistheorie) (Seminar, 1,5 SWS)  
Wernecke J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20705: Diversity and Conflict Management | Diversität und Konfliktmanagement

Version of module description: Gültig ab summerterm 2013

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 38	<b>Contact Hours:</b> 22

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Studierenden verfassen einen Essay im Umfang von 1000 - 1500 Worten. Im Rahmen des Essays zeigen sie, dass sie Konflikte theoretisch einordnen und Methoden zur Konfliktlösung anwenden können (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Das Seminar erläutert theoretisch die Rolle von Diversität in Konflikten und die Chancen und Risiken, die sich daraus ergeben. Es wird sich dabei mit den Hintergründen von Konflikten und deren systematischen Kategorisierung als auch mit Lösungsansätzen und Konfliktstrategien beschäftigen. Theoretische Modelle werden anhand eigener Beispiele praktisch greifbar gemacht.

#### Intended Learning Outcomes:

Nach der Teilnahme am Workshop sind die Studierenden in der Lage, die Chancen von Diversität in einer Gruppe zu erkennen und sie konstruktiv in ihre Arbeit zu integrieren. Sie können Konflikte theoretisch einordnen und kennen praktische Methoden welche zur gelungenen Konfliktlösung führen. Zudem sind sie in der Lage diese Methoden im späteren Arbeitsleben einzusetzen. Die Studierenden können ihr eigenes Konfliktverhalten reflektieren und gegebenenfalls verschiedene Schemata als Analysebehelfe einsetzen.



**Teaching and Learning Methods:**

Die Teilnehmer/innen werden an praktischen, teils auch eigenen Beispielen und mit partizipativen Methoden ihren eigenen sozio-kulturellen Hintergrund reflektieren, Konfliktmanagement erfahren und die praktische Erfahrung in theoretische Hintergründe einbetten.

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Diversität und Konfliktmanagement (Streiten über Unterschiede, Unterschiede im Streiten)

(Workshop, 1,5 SWS)

Haberl M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20710: Global Diversity Training | Global Diversity Training

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 38	<b>Contact Hours:</b> 22

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Students will deal with their own cultural background in a short group presentation and deeply reflect on the learning outcomes of the workshop in a learning summary (100% of grade).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Collaboration in international teams is becoming a crucial everyday part of working environments. It brings numerous benefits, but can also lead to misunderstandings, confusions and conflicts that can hinder productivity.

The aim of the training is to prepare participants for teamwork from an intercultural perspective and especially to reflect the influence of diversity on the team process in international teams. To achieve this goal, we will work with science-based models, short lectures and numerous exercises with a strong focus on the relevance for your professional and daily life.

#### Intended Learning Outcomes:

After this workshop you will be able to individually deal with our own cultural background and its impact on intercultural collaboration

- Analyze the role and tasks of team leaders in an intercultural context.
- Develop strategies for case studies in international teams.
- be able to analyze situations of your professional life in an international team.

**Teaching and Learning Methods:**

The workshop will be a mix of input, case studies, discussions and group work.

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Global Diversity (Successful in International Teams) (Workshop, 1,5 SWS)

Prahl M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA20910: Gender Competence as Core Qualification | Genderkompetenz als Schlüsselqualifikation

Version of module description: Gültig ab winterterm 2010/11

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 45	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einer schriftlichen Ausarbeitung von 5 Seiten zeigen die Studierenden anhand von aktuellen Fragestellungen, zu Themen wie Frauenquote, Vereinbarkeit und Rollenveränderung von Eltern, wie (veränderbare) Geschlechterrollen unsere Wirklichkeit prägen und wie sich durch einen konstruktiven und reflektierten Umgang damit auch persönliche Möglichkeiten erweitern lassen (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

An der Hochschule sind die Anforderungen und Ansprüche in den letzten Jahren stark gestiegen. Einhergehend mit den Veränderungen der Hochschule haben sich auch die Rollenanforderungen an ihre Mitglieder gewandelt. Auch Männer- und Frauenbilder sind in einem stetigen Veränderungsprozess. Geschlechterrollen beeinflussen unser alltägliches Verhalten und unsere Wahrnehmung. Hier setzt der Workshop an:

Welche Geschlechterrollen und Vorbilder prägen heute unsere Wirklichkeit? Welchen Einfluss haben andere Kulturen auf unser Verhalten? Und wie können wir mit den bestehenden Geschlechterrollen konstruktiv umgehen und unsere persönlichen Möglichkeiten erweitern? Wo treffe ich in meinem Umfeld auf genderspezifische Handlungs-Muster und -Strukturen?

#### Intended Learning Outcomes:

Nach der erfolgreichen Teilnahme an diesem Workshop sind die Studierenden in der Lage darzustellen, welche Geschlechterrollen und Vorbilder unsere Wirklichkeit prägen. Weiterhin

können die Studierenden veranschaulichen wie sie mit den bestehenden Geschlechterrollen - nicht nur - in ihrem Umfeld konstruktiv umgehen.

**Teaching and Learning Methods:**

Das Seminar beinhaltet theoretische Inputs, Gruppenarbeit, Rollenspiele und kollegiales Feedback.

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Genderkompetenz als Schlüsselqualifikation (Online-Workshop und interaktives Lernprojekt)  
(Workshop, 1 SWS)

Fänderl W, Quindeau A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA21005: Introduction to Diversity Management | Einführung in Diversity Management

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 45	<b>Contact Hours:</b> 15

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einer Kurzpräsentation und einer schriftlichen Ausarbeitung zeigen die Studierenden die Bedeutung von Diversity in Organisationen auf. Sie reflektieren welche Möglichkeiten und Herausforderungen durch Diversity Management geschaffen werden können (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Diversity Management und Diversity Kompetenz sind für Organisationen zu zentralen und notwendigen Aufgaben geworden.

Die Etablierung einer Wertschätzungskultur, Chancengleichheit und die Förderung kreativer und innovativer Lösungsansätze sind wesentliche Ziele des Diversity Managements: Wie kann ich mit der passenden Kombination von Vielfalt das Optimum für ein Projekt oder eine Veranstaltung herausholen? Der gelungene Umgang mit Diversity hängt nicht nur von persönlichen Fähigkeiten und Handlungsoptionen ab, sondern auch von der Kompetenz sich auf Unterschiedlichkeiten eines Teams, wie ethnische Herkunft, Hautfarbe, sexuelle Identität, Alter, Geschlecht, Religion und Behinderung einzustellen. Auch institutionelle Voraussetzungen (AGBs und Rechtsrahmen, kulturell-religiöse Vorgaben, Willkommenskultur etc.) wirken sich darauf aus.

Folgende Themen werden behandelt:

- Diversity-Management-Theorie
- Beispiele für Rahmenbedingungen an Universitäten, Unternehmen und Institutionen in unterschiedlichen Ländern

- Reflexion eigener Vielfalt, Kooperations- und Abgrenzungsmechanismen
- Gemeinsame Erstellung eines TUM Diversity Magazins mit Artikeln zu Theorie und Praxis von Diversity Kompetenz in Wirtschaft und Wissenschaft.

**Intended Learning Outcomes:**

Nach erfolgreicher Teilnahme am Workshop verstehen die Studierenden die Grundlagen des Diversity Managements und sind für das Thema sensibilisiert. Sie können demonstrieren wie man Diversity in Organisationen schafft und sie können persönliche Stereotypen erkennen. Die Studierenden lernen die praktische Recherche und daraus resultierend die Veröffentlichung eigener Artikel.

**Teaching and Learning Methods:**

Anhand von theoretischen Inputs, Übungen und Gruppenarbeit wird in die Thematik des Diversity Management eingeführt.

Reader und ergänzende Literatur; Rollenspiel; Erfahrungsaustausch, Diskussion und Reflexion; kollegiales Feedback.

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Diversity Kompetenz (Online-Workshop und interaktives Lernprojekt) (Workshop, 1 SWS)

Fänderl W, Quindeau A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA21008: Fundamental Principles of Globalisation | Grundlagen der Globalisierungsforschung

Version of module description: Gültig ab winterterm 2010/11

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 38	<b>Contact Hours:</b> 22

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Studierenden reflektieren in einem Essay (3-6 Seiten) an einem Beispiel globale Auswirkungen privaten oder beruflichen Handelns und diskutieren Lösungsansätze.

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Anhand bestimmter Rohstoffe (z.B. Aluminium) und Produkte (z.B. Computer) werden beispielhaft globale Zusammenhänge aufgezeigt, die im alltäglichen Gebrauch dieser Stoffe üblicherweise ausgeblendet werden. Diese finden sich auf menschenrechtlich-individueller Ebene genauso wieder wie auf der politischen, sie sind auf einen nachhaltigen Umgang mit der Umwelt genauso bezogen wie auf die Wirtschaft. Die Ursachen dafür sind teilweise struktureller Natur, die Konsequenzen aus der teilweise ungerechten Vernetzung sind genauso global wie auch deren Ursachen.

Anhand von den zukünftigen Arbeitsfeldern der TeilnehmerInnen werden theoretische Modelle praktisch aufgezeigt.

#### Intended Learning Outcomes:

Nach der Teilnahme an der Veranstaltung sind die Studierenden in der Lage, selbstständig über die Auswirkungen ihrer privaten und beruflichen Handlungen in Bezug auf globale Verbindungen zu recherchieren und zu reflektieren. Sie können globale Güterketten von Produkten und Rohstoffen analysieren und auf ihre Auswirkungen hin hinterfragen. Am Ende des Kurses können die TeilnehmerInnen das Modell des ungleichen Tausches anwenden und verstehen die sich



daraus ergebende Ungleichverteilung von Wohlstand in der Welt. Die Studierenden kennen verschiedene Lösungsansätze für eine global gerechtere Welt und können sie auf ihre Vor-, Nachteile und Realisierbarkeit untersuchen.

**Teaching and Learning Methods:**

Die Teilnehmer/innen werden an praktischen, teils eigenen Beispielen und mit partizipativen Methoden konkrete Produkte untersuchen und diese in theoretische Hintergründe einbetten. Die Methodik basiert auf dem didaktischen Konzept des Globalen Lernens.

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Globale Zusammenhänge erkennen (Grundlagen der Globalisierungsforschung für TechnikerInnen) (Workshop, 1,5 SWS)

Haberl M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA21023: Passing Exams in Relaxed Mode | Entspannt Prüfungen bestehen

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 36	<b>Contact Hours:</b> 24

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Modulprüfung umfasst eine schriftliche Selbstreflexion (2-4 Seiten), die zu den unterschiedlichen Aspekten des Kurses Stellung nimmt.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Die Teilnehmenden bringen ein persönliches Anliegen zur Verbesserung ihrer Prüfungsvorbereitung und ihrer Prüfungserfolge mit.

#### Content:

Stellen Sie sich vor, morgen ist eine wichtige Prüfung – und Sie kommen locker durch. Obwohl Prüfungen Ihnen immer Stress und schlaflose Nächte bereiten.

Wir helfen Ihnen, die für Sie richtige Prüfungs-Strategie zu finden. Sie erfahren, wie Sie sich nach neuesten wissenschaftlichen Erkenntnissen am besten vorbereiten und wie Sie im entscheidenden Moment entspannen und Ihr Wissen präzise und umfassend wiedergeben können. Mit modernen Coaching-Techniken verwandeln wir Ihre eigenen Zweifel in eine Erfolgsstory. Dieser dreitägige Coaching-Workshop richtet sich an Studierende, die sich mehr Gelassenheit in Prüfungssituationen wünschen und ihr Studium mit gutem Erfolg abschließen wollen.

#### Intended Learning Outcomes:

Ziel des Moduls ist, den eigenen Umgang mit Prüfungssituationen zu reflektieren, unterschiedliche Techniken für die Vorbereitung und das Bestehen von Prüfungen zu kennen, mit belastenden Prüfungssituationen souverän umgehen zu können und die eigene Prüfungsvorbereitung zielführend und termingerecht zu gestalten.

**Teaching and Learning Methods:**

Input und Vortrag, Gruppenarbeit, Selbstreflexion und Einzelarbeit

**Media:**

**Reading List:**

Baumeister/Thierney/Neubauer: Die Macht der Disziplin, 2012

Engelbrecht Sigrid: Ich müsste wollte sollte, 2011

Grüning Christian: Garantiert erfolgreich lernen, 2009

Metzig/Schuster: Prüfungsangst und Lampenfieber, 2009

Mortan/Mortan: Bestanden wird im Kopf, 2009

Hafner/Kronenberger: Entspannt Prüfungen bestehen, 2015

**Responsible for Module:**

Barbara Vierthaler (vierthaler@zv.tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Entspannt Prüfungen bestehen (Workshop, 2 SWS)

Hafner B, Kronenberger U

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA21209: Introduction to Scientific Working | Einführung in das wissenschaftliche Arbeiten

Version of module description: Gültig ab summerterm 2011

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 38	<b>Contact Hours:</b> 22

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Im Laufe des Workshops erstellen die Studierenden ein Schreibportfolio, in dem sie die relevanten Kenntnisse wissenschaftlichen Arbeitens umsetzen (Prüfungsleistung).

#### Repeat Examination:

#### (Recommended) Prerequisites:

#### Content:

Das Seminar gestaltet sich nach folgenden Inhalten:

- verschiedene Arten von wissenschaftlichen Arbeiten und ihre Qualitätsanforderungen
- ethische Fragen: Suche, Auswahl und Verwendung von Informationen
- pragmatisches Wissen zur systematischen Recherche
- korrektes Zitieren, Paraphrasieren und Bibliographieren
- Planung und Abwicklung Ihres wissenschaftlichen Projekts
- Konzeption, Erstellung und Überarbeitung schriftlicher Arbeiten

#### Intended Learning Outcomes:

Nach erfolgreicher Teilnahme am Kurs sind die Studierenden in der Lage:

- Merkmale, Ziele und Vorgehen des wissenschaftlichen Arbeitens anzuwenden
- Qualitätsanforderungen an verschiedene Arten wissenschaftlicher Arbeiten zu identifizieren
- ein wissenschaftliches Arbeitsprojekt selbständig zu planen und abzuwickeln
- pragmatisches Wissen zur systematischen Recherche einzusetzen
- korrekt zu zitieren und zu paraphrasieren
- ein Literaturverzeichnis zu erstellen

**Teaching and Learning Methods:**

- Theorieinput, deduktive und induktive Methoden, Diskussionen
- Kleingruppenarbeit (Textanalyse, Review, Miniprojekt)

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Aniko Balazs

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA21411: Stress Competence | Stresskompetenz [EDS-M4]

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 30	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Modulprüfung besteht aus einer schriftlichen Selbstreflexion (2-4 Seiten), die zu den Themen des Kurses Stellung nimmt und die persönliche Entwicklung über vier Wochen nach dem Kurs nachzeichnet. Insbesondere werden Faktoren der Stressentstehung, eigene Denkweisen und Einstellungen sowie selbst erprobte Lösungsmöglichkeiten reflektiert. Zum Erreichen der Lernergebnisse ist es notwendig, zwischen den einzelnen Kurstagen Hausaufgaben zu erarbeiten (z.B. Kleine Übungen für den Alltag, Selbstreflexionsübungen, Lesen von Aufsätzen).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Die Teilnehmenden bringen ein persönliches Anliegen zur Verbesserung Ihres Umgangs mit Stress und Leistungsdruck mit.

#### Content:

Was ist Stress und wie kann ich mit Belastungen umgehen, um meine Energiewaage im Gleichgewicht zu halten?

Was sind meine persönlichen stressauslösenden Gedanken und wie kann ich sie positiv beeinflussen?

Wie zeigt sich der Stress in meinem Körper und wie kann ich bewusst in die Entspannung finden?

Höher, schneller, weiter... So fühlt es sich für viele Studierende an, wenn sie in möglichst kurzer Zeit möglichst gute Leistungen erbringen sollen. Oft gelingt es sehr gut, allen Anforderungen im Studium gerecht zu werden, doch manchmal nimmt der Druck überhand und Stress oder Gefühle der Überlastung stellen sich ein.

Basierend auf neuesten medizinischen sowie psychologischen Erkenntnissen erfahren Sie in dieser 3-tägigen Seminarreihe, wie Sie in solchen Situationen körperlich und mental fit bleiben und erlernen vielfältige Methoden, die Sie in Ihrem (Studien-) Alltag sofort anwenden können.

**Intended Learning Outcomes:**

Ziel des Moduls ist es, die Arbeits- und Lernfähigkeit der Teilnehmenden wieder herzustellen bzw. Möglichkeiten kennen, die eigene Leistungsfähigkeit dauerhaft zu erhalten.

Nach der Teilnahme sind die Studierenden in der Lage

- biologische, psychische sowie soziale Prozesse der Stressentstehung zu verstehen
- förderliche Denkweisen und Einstellungen zu entwickeln
- unterschiedliche Entspannungsmethoden erfolgreich anzuwenden
- und individuelle Lösungen für einen gesunden und gelasseneren Umgang mit Belastungen zu finden.

**Teaching and Learning Methods:**

Theoretischer Input, Selbstreflexion, Einzel- und Gruppenarbeit, Praktische Übungen

**Media:**

**Reading List:**

**Responsible for Module:**

Barbara Vierthaler (vierthaler@zv.tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

TK-MentalStrategien - stressfreier durchs Studium (Workshop, 2 SWS)

Brucks A

Stark durchs Semester: Ziele erreichen und die eigene Gesundheit im Blick behalten (Workshop, 2 SWS)

Müller-Hotop R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA30257: Big Band | Big Band

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Studierende zeigen, dass sie ihre eigenen Gestaltungsideen einbringen und im Ensemble gemeinsam musizieren können (Studienleistung). In einer mündlichen Prüfung werden vor allem Fähigkeiten wie Blattlesen und Intonation getestet (Prüfungsteilleistung 50%), theoretische Kenntnisse werden zusätzlich in einer schriftlichen Klausur vertieft unter Beweis gestellt (Prüfungsteilleistung 50%). Die Gesamtnote setzt sich aus der gleichwertigen Evaluation dieser drei Elemente zusammen.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Musikinteressierte Studierende mit ausgeprägter Spielerfahrung

#### Content:

In diesem Workshop liegt der Schwerpunkt in der aktiven musikalischen Erarbeitung verschiedener Arrangements, die für die klassische Jazz-Orchester-Besetzung geschrieben sind, d.h. fünf Saxophone, vier Posaunen, vier Trompeten, Rhythmusgruppe (Klavier, Bass, Schlagzeug). Bei der Auswahl des Notenmaterials wird nach Möglichkeit jede Stilrichtung berücksichtigt.

#### Intended Learning Outcomes:

Nach erfolgreicher Teilnahme sind die Studierenden in der Lage ein besonderes Augenmerk auf das bewusste (!) Zusammenspiel und die gemeinsame Gestaltung zu legen. D.h. sie können im Satzspiel eine gemeinsame Phrasierung, Intonation, Dynamik, Artikulation sowie einzelne rhythmische Details anwenden.



**Teaching and Learning Methods:**

In den Methoden kommen unter anderem Elemente der Körperperkussion sowie die gesangliche Umsetzung von Melodiephrasen zur Anwendung. Im Wechselspiel der verschiedenen Sätze werden kompositorische und harmonische Strukturen erläutert und erlebt. Besonders gefördert wird bei jedem Teilnehmer die Kompetenz, gleichzeitig verschiedene Anforderungen zu bewältigen, hier im Besonderen ein gesundes Gleichgewicht zu erreichen aus Aktion (Blattspiel, Notenlesen) und Reaktion (Hörvermögen und daraus resultierendes Einfühlungsvermögen in den Gesamtklang).

**Media:**

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Big Band (Workshop, 2 SWS)

Muskini K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA30258: Jazz Project | Jazzprojekt

Version of module description: Gültig ab winterterm 2011/12

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In einer schriftlichen und mündlichen Prüfung wird geprüft inwieweit die Teilnehmer die Grundkenntnisse der Harmonielehre, Vorspielen oder Vorsingen verschiedener rhythmischer Phrasen, einfache Gehörbildung (Bestimmen verschiedener Intervalle und Akkorde), Vorspiel eines Themas mit anschließender Improvisation beherrschen. (Gewichtung: 1:1:1:1)

#### Repeat Examination:

#### (Recommended) Prerequisites:

Grundwissen in Harmonielehre und etwas Spielerfahrung

#### Content:

Erarbeitung mehrerer Musikstücke

#### Intended Learning Outcomes:

Die Studierenden sind in der Lage, Grundlagen der Harmonielehre, Rhythmik, Gehörbildung und Improvisation anzuwenden.

#### Teaching and Learning Methods:

Neben den klassischen Methoden aus der Musikpädagogik werden auch Instrumente aus dem Improvisationstheater genutzt. Dadurch wird die Kompetenz der Teilnehmer bei der persönlichen Interpretation von Themen als auch bei der solistischen Improvisation über verschiedene Akkordfolgen gefördert und die nötige Routine angebahnt.

#### Media:

**Reading List:**

**Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Jazzprojekt (Workshop, 2 SWS)

Muskini K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA30704: Thinking, Perceiving, and Knowing | Denken, Erkennen und Wissen

Version of module description: Gültig ab summerterm 2012

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 67	<b>Contact Hours:</b> 23

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Das Modul wird mit einer Modulprüfung in Form eines Essays (1000-1500 Wörter, inkl. unbenotetem Referat zur Vorbereitung) abgeschlossen. 'Dadurch dokumentieren die Studierenden, dass sie zentrale Grundprobleme der Erkenntnistheorie verstanden haben und veranschaulichen können. Im Essay (Prüfungsleistung) erörtern die Studierenden eine zentrale erkenntnistheoretische Fragestellung und dokumentieren damit ein vertieftes Verständnis der Problemstellung.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

#### Content:

In unserem alltäglichen Sprachgebrauch verwenden wir die Ausdrücke »Denken«, »Erkennen« und »Wissen« oft sehr ungenau, zuweilen sogar synonym. Hingegen hat bereits die antike Philosophie wichtige Abgrenzungen formuliert, die in der Neuzeit und Moderne spezifische Weiterentwicklungen bis hin zur aktuellen Neuro-Philosophie erfahren haben.

Das Seminar vermittelt eine Übersicht der europäischen Klassiker der Erkenntnistheorie, indem es die unterschiedlichen Ansätze zentraler Autoren pointiert vor- und zur Diskussion stellt. Die vorgestellten Ansätze reichen von der Ontologie und Metaphysik, dem Rationalismus, Idealismus und Empirismus bis zu den aktuellen empirischen Kognitionswissenschaften. Vor diesem Hintergrund soll auch der Frage nachgegangen werden, welches Verständnis von Wissenschaft hieraus womöglich resultiert (et vice versa).

**Intended Learning Outcomes:**

Die Teilnehmer besitzen vertiefte Grundkenntnisse über exemplarische Problemfelder der Erkenntnistheorie und verstehen Grundprobleme des Erkennens. Sie sind in der Lage eine zentrale erkenntnistheoretische Fragestellung in schriftlicher Form zu erörtern und deren Relevanz für moderne Erkenntnis- und Wissenschaftskonzepte sowie für die Gesellschaft argumentativ einzuordnen.

**Teaching and Learning Methods:**

Essay, Vorlesung, textbasiertes Seminar, Referate, Gruppenarbeit, Diskussionen, Selbststudium insbes. Lektüre / Erarbeitung von Texten

**Media:**

Skripte / Reader, Thesenpapiere, Tafelbilder, Power-Point

**Reading List:**

**Responsible for Module:**

PD Dr. Jörg Wernecke

**Courses (Type of course, Weekly hours per semester), Instructor:**

Denken, Erkennen und Wissen (Eine Einführung in die Erkenntnistheorie) (Seminar, 1,5 SWS)  
Wernecke J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA31900: Lecture Series Environment - TUM | Vortragsreihe Umwelt - TUM

Version of module description: Gültig ab winterterm 2019/20

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 67	<b>Contact Hours:</b> 23

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a poster created in a group of 2-3 people connecting topics from at least two lectures. In order to collect material for the poster, participants have to organize themselves in discussion groups with 5-6 people.

Each discussion group will split into two groupes for the poster. At the end of the semester the poster has to be presented. Every member of the poster group has to speak one minute, The grade will consist of the poster and its presentation.

Mandatory requirements for the examination

For the 3-ECTS course a successful accomplishment of 16 academic performances is mandatory for the examination!

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

#### Content:

The systematic integration of education for sustainable development at the university is an extremely complex challenge that can only be addressed through a plural and multi-perspective approach. Within the framework of the UNESCO World Programme of Action "Bildung für Nachhaltige Entwicklung" (BNE; =Education for Sustainable Development), the interdisciplinary lecture series Umwelt - TUM takes place at the TUM Campus Garching, which deals with changing topics in the field of environmental sustainability.

It is organized by the newly founded branch of the environmental department AStA TUM at the Garching campus to promote sustainability awareness at TUM and to offer interested students the opportunity to deal with the topic in more detail.

**Intended Learning Outcomes:**

After successful participation in this module, students are able to understand lectures at a high scientific level and reproduce central statements. Students are able to comprehend analyses of sustainable development and are familiar with formulating their own positions and justifying them in discussions. Furthermore, they know where they can explore the topic of sustainability in more detail on campus, whether in the form of course offerings, internships, projects or thesis.

**Teaching and Learning Methods:**

It consists of six lectures and an organizational meeting at the beginning. Each lecture includes two 40-minute presentations, a 15-minute break and a subsequent 45-minute discussion with the speakers, which is realized in cooperation with the Zentrum for Schlüsselkompetenzen (Center for Key Competencies) of the Faculty of Mechanical Engineering.

The lectures and presentation slides will be uploaded to the online learning platform Moodle.

As homework, students will prepare a short report of the lectures and the discussion session. In addition, introductory and further literature will be addressed to enhance more detailed discussions of the lectures.

**Media:**

**Reading List:**

**Responsible for Module:**

Dr. phil. Alfred Slanitz (WTG@MCTS)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Overcoming Obstacles - the Bumpy Road toward Carbon Neutrality (Ringvorlesung Umwelt) - Garching (Vorlesung mit integrierten Übungen, 1,5 SWS)

Fahmy M, Kopp-Gebauer B, Recknagel F, Slanitz A, Zimmermann P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA90142: Self-Competence - Intensive Course | Selbstkompetenz - intensiv

Version of module description: Gültig ab winterterm 2013/14

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 1	<b>Total Hours:</b> 30	<b>Self-study Hours:</b> 12	<b>Contact Hours:</b> 18

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Modulprüfung besteht aus einem Bericht in Form einer Selbstreflexion (2-4 Seiten). Die persönliche Entwicklung (Veränderung im Lern- und Arbeitsverhalten) wird dabei nachgezeichnet.

#### Repeat Examination:

Next semester / End of Semester

#### (Recommended) Prerequisites:

Das persönliche Anliegen, ein bestimmtes Verhalten verändern zu wollen, um mehr Erfolg in Prüfungen und im Studium zu erzielen.

#### Content:

Selbstkompetenz meint die Bereitschaft, Anforderungen im Studium zu reflektieren, mit Schwierigkeiten gelassen umzugehen und eigene Begabungen zu entdecken. Immer, wenn unsere Verhaltensweisen für das Erreichen eines Ziels nicht mehr hilfreich sind, müssen wir neue Wege finden. Unsere Workshops bieten Studierenden die Möglichkeit, eigenes Verhalten zu reflektieren und neue Strategien zu entwickeln.

Das Modul "Selbstkompetenz - intensiv" dient grundsätzlich der Verbesserung der eigenen Lern- und Arbeitsfähigkeit. Folgende Themen werden innerhalb des Moduls vermittelt:

- Ziele entwickeln und erreichen
- Aktivierung eigener Ressourcen
- Umgang mit Stress und Emotionen
- Umgang mit Ängsten und Blockaden
- Zukunfts-Visionen aufbauen und Motivation stärken
- Mit der eigenen Energie haushalten



**Intended Learning Outcomes:**

Nach der Teilnahme an einem Kurs aus diesem Modul sind die Studierenden in der Lage, ihr eigenes Lern- und Arbeitsverhalten zu analysieren und zu verstehen, welches Verhalten zu Misserfolgen führt. Darauf aufbauend können sie eigene Lösungsansätze für ein erfolgreicherer Arbeiten entwickeln, das Leistung und Gesundheit gleichermaßen im Blick behält.

**Teaching and Learning Methods:**

Gruppenarbeit, Selbstreflexion, Theorie-Inputs

**Media:**

**Reading List:**

**Responsible for Module:**

Barbara Vierthaler (vierthaler@zv.tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Erfolgreich durchs Studium. Selbstmanagement in herausfordernden Zeiten (Online-Kurs)  
(Workshop, 1,5 SWS)

Hafner B ( Recknagel F ), Kronenberger U, Müller-Hotop R, Reichhart T

Zeit- und Selbstmanagement (Workshop, 1,5 SWS)

Hann S

Schluss mit dem Aufschieben (Workshop, 1,5 SWS)

Kronenberger U

Haltung entwickeln (Was hat Haltung mit Erfolg zu tun?) (Workshop, 1,5 SWS)

Mader S

Selbstführung: Ja klar! Aber wie? (Workshop, 1,5 SWS)

Mehrl F

Go with the Flow (Besser studieren mit Life Media Balance ) (Workshop, 1,5 SWS)

Miller M

Selbstwahrnehmung, Improvisation und Körpersprache (Raus aus dem Kopf, rein in den Körper)  
(Workshop, 1,5 SWS)

Molin V

Keine Angst vor der Angst (Bewusster Umgang mit Lampenfieber und Präsentationen) (Workshop, 1,5 SWS)

Mornell A

Ressourcentraining (Eigene Stärken erkennen und wirkungsvoll einsetzen) (Workshop, 1,5 SWS)

Mühlich E

Mein innerer Kompass – Wie Werte meine Ziele und Träume stärken (Workshop, 1,5 SWS)

Schnack Q

Richtig gut studieren! – Jetzt erst recht! (Workshop, 1,5 SWS)

Zeus R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### CLA90211: Art and Politics | Kunst und Politik

Version of module description: Gültig ab summerterm 2017

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 2	<b>Total Hours:</b> 60	<b>Self-study Hours:</b> 38	<b>Contact Hours:</b> 22

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Die Studierenden zeigen in einer Präsentation (20 min.) oder einem Essay (1500 Wörter), dass sie wissenschaftliche Literatur über die sozialen und politischen Bedingungen und Folgen künstlerischen Schaffens verstehen und anhand konkreter Werke veranschaulichen können.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

#### Content:

Kunst entsteht nicht im leeren Raum. Wie reagieren Kunstschaffende – bewusst oder unbewusst - auf politische Ereignisse? Lassen sich gesellschaftliche Bedingungen in ihren Werken erkennen? Und wie beeinflussen einzelne Kunstwerke die gesamte Kultur?

Im Modul lernen Studierende anhand von Beispielen aus der Musik, Literatur oder bildenden Kunst, wie Kunst und Gesellschaft sich wechselseitig beeinflussen, wie höchst kreative Menschen in ihrem Schaffen Stellung nehmen und wie sich ihre Produkte auf die Situation des Menschen auswirken.

#### Intended Learning Outcomes:

Die Studierenden sind in der Lage, Bedingungen und Folgen künstlerischen Schaffens exemplarisch zu verstehen und in Werken der Musik, Literatur und bildenden Kunst zu identifizieren. Sie können Beispiele mittels wissenschaftlicher Literatur selbständig erarbeiten und die Ergebnisse mündlich oder schriftlich vermitteln.

**Teaching and Learning Methods:**

Seminar. Vorbereitende Lektüre, Referate, Bildbetrachtungen/Textinterpretationen/Werkanalysen, Exkursionen in Ausstellungen und Konzerte

**Media:**

**Reading List:**

**Responsible for Module:**

Fred Slanitz

**Courses (Type of course, Weekly hours per semester), Instructor:**

Staging Memory - Theater und Erinnerungsarbeit (Seminar, 1,5 SWS)

Valdés-Stauber M ( Valdes Stauber C )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ0812: Cultural Competence: Choir and Orchestra | Kulturelle Kompetenz: Chor- und Orchester

Version of module description: Gültig ab summerterm 2010

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> German	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 30	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In Form einer Präsentation referieren die Teilnehmer und Teilnehmerinnen über ein gemeinsam mit den Dozierenden festgelegtes Thema aus dem Bereich Musik.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Vorspiel oder Vorsingen zu Beginn des Semesters

#### Content:

Nach einem Vorsingen oder Vorspiel zu Beginn des Semesters, welches über die Teilnahme entscheidet, wird in regelmäßigen gemeinsamen Proben ein Konzertprogramm erarbeitet, welches am Ende des Semesters in einem oder mehreren Konzerten öffentlich dargeboten wird.

#### Intended Learning Outcomes:

Am Ende der Lehrveranstaltung sind die Teilnehmer und Teilnehmerinnen in der Lage, bei der Aufführung der einstudierten Werke eine hervorragende und hochkonzentrierte musikalische Darbietung zu erbringen. Zudem können sie ein musikalisches Thema verständlich, präzise und überzeugend darlegen.

#### Teaching and Learning Methods:

Gemeinsame Proben

#### Media:

**Reading List:**

**Responsible for Module:**

Felix Mayer

**Courses (Type of course, Weekly hours per semester), Instructor:**

Chorarbeit (Workshop, 2 SWS)

Neumair M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Elective Courses | Wahlmodule

### Science Topics | Science Topics

## Management and Protection of Forest Ecosystems | Management and Protection of Forest Ecosystems

### Module Description

## WZ4161: Forest Management | Forest Management

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

### Description of Examination Method:

The module integrates different scientific and management methods with the objective to develop concepts for the sustainable management of forest. Forest managers must understand complex content and be able to explain it to a critical audience. The learning outcome will be assessed by an oral exam (30 minutes) covering the whole outcomes of the module.

### Repeat Examination:

Next semester

### (Recommended) Prerequisites:

None.

### Content:

1. Definition of forest and forest ecosystem
2. Overview of forestry on global, regional and local scales
3. Introduction into objectives and methods of forest ecosystem management and forest management planning
4. Demonstration of forest decision support systems and multiple-objective optimization
5. Overview of silvicultural techniques
6. Basic Knowledge of Forest economics

7. Demonstration of examples in lowland and mountain forest management.

**Intended Learning Outcomes:**

At the end of the module the students are able to:

- understand different concepts of forest management
- understand different demands in forest management
- apply means of linear programming to harmonize different measures
- apply decision support systems
- evaluate different forest management measures.

**Teaching and Learning Methods:**

The module is separated into lectures and exercises. Lectures providing the theoretical foundations and concepts in Forest Management.

Exercises are done in supervised groups in the field.

**Media:**

PowerPoint presentations, additional reading material, software application.

**Reading List:**

FAO (2018): State of the World's Forests; FAO (2016): Global Forest Resources Assessment 2015.

**Responsible for Module:**

Felbermeier, Bernhard; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Forest Ecosystem Management (Vorlesung, 2 SWS)

Felbermeier B [L], Annighöfer P, Felbermeier B

Forest Management Planning (Übung, 3,5 SWS)

Knoke T, Bödeker K, Döllerer M, Holzer D, Pintado K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ2716: Forest Growth and Forest Operations | Forest Growth and Forest Operations

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning success of the module Forest Growth and Forest Operations will be assessed by a written examination of 90 minutes. This is due to the fact that biometric topics, growth processes and analyses as well as the forest growth modelling part of the lecture can be presented best in a written form by drawings, figures, calculation schemes, etc. For example the description of biological processes and growth cycles in forest growth simulators can best be explained and depicted by graphical representations.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in biology and forest science.

#### Content:

The part Forest Growth deals with objectives and methods of forest growth and yield science. First, as fundamental topic, principal factors of the organic production of forest stands based on the driving forces (climate, water, nutrients) are shown and explained. In a next step growth and yield is analyzed more closely as part of the total production of plant communities. This leads to principles of tree shape development, tree growth and carbon dynamics in general. From individual tree growth the course proceeds to structure and development of whole forest stands. Both previous subjects provide the basic knowledge for understanding the effect of silvicultural treatment on quantitatively measured growth and yield characteristics. Growth trends, productivity and carbon dynamics of the main tree species in Central Europe are presented. Analyses of stand structure, growth and yield in the view of climate change are discussed. Different types of forest growth models on tree, stand and forest enterprise levels are introduced. The part Forest Operations can be divided in 5 topics: (1) Overview of mechanized harvesting (methods and

most common systems), (2) Environmentally sound resource road planning and construction, (3) Assessing the environmental impacts of forest operations on forest stands and soils, (4) Means of eco-efficient wood transportation from the forest to the mill and (5) Current developments in small-scale forest operations.

**Intended Learning Outcomes:**

On successful completion of the module, students are able to

- Understand the environmental factors influencing the forest stand production
- Describe the effects of silvicultural treatment on quantitatively measured growth and yield characteristics
- Understand the principles of growth models
- Analyze and evaluate the impact of environmental changes on tree and stand growth
- Create possible silvicultural measures to mitigate negative effects of environmental changes on forest stand growth
- Understand and evaluate the impact of biotic and abiotic factors on growth, vitality and stability of individual trees and forest stands
- Understand the fundamentals of sound resource road planning and construction
- Describe the links between mechanized harvesting and potential stand and soil damages
- Evaluate the productivity and carbon footprint of different harvesting systems.

**Teaching and Learning Methods:**

Lectures and presentations, field trip (optional).

**Media:**

Lectures and presentations (pdfs).

**Reading List:**

FOREST GROWTH: Pretzsch, H., (2009): Forest Dynamics, Growth and Yield. Springer Verlag, Berlin, 664 S. 2009 published as Hardcover (ISBN 978-3-540-88306-7) 2010 published as paperback (ISBN 978-3-642-14861-3)

FOREST OPERATIONS: Bowers, S. 2012. Designing woodland roads. Oregon State University. EC 1137. 21 pp. Dykstra, D. P. and Heinrich, R. 1996. FAO Model code of forest harvesting practice. 85 pp. Enters, D., Applegate, G.B., Kho, P. C.S., and Man, G. (Eds.) 2002. Applying reduced impact logging to advance sustainable forest management. FAO. Heinrich, R. Recent developments on environmentally friendly forest road construction and wood transportation in mountainous forests. Rummer, B. 2009. New technology in forest operations. www.forestlandowners.com. 3 pp. Sutherland, B.J. 2003. Preventing soil compaction and rutting in the boreal forest of western Canada. FERIC. 53 pp.

**Responsible for Module:**

Rötzer, Thomas; Apl. Prof. Dr. agr. habil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Low Impact Forest Operations (Vorlesung, 1,5 SWS)

Engler B, Bauer E

Low Impact Forest Operations Technology (Exkursion, ,5 SWS)

Engler B, Bauer E

Forest Growth (Vorlesung, 2 SWS)

Pretzsch H, Rötzer T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2717: Genetic Resources Management and Forest Protection | Genetic Resources Management and Forest Protection

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning outcome will be assessed by a written exam (duration 60 min) where the student have to analyze the risk of given pest and abiotic hazard-scenarios and to develop adequate disturbance management strategies. Furthermore, they have to analyze a genetic diversity study from a plant, animal or fungus species and develop a long-term genetic management strategy. In this way, the students can demonstrate that they have obtained the ability to use their knowledge in real world management situations.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in biology and forest science

#### Content:

PPart I Genetic Resources Management – Schaefer/Benz

1. Introduction: DNA, genetic code, genes, alleles, genomes, speciation
2. Basics of Population Genetics
3. Genetic variation in forest ecosystems
4. Tree breeding
5. Genetic conservation & sampling strategies
6. GRM in mountain ecosystems
7. GRM in the Tropics
8. GRM in the dry zones
9. Sustainable management strategies
10. Fungi – The Good, the Bad, and the Ugly
11. The genetic treasure trove of fungi

## Part II Disturbance ecology & management– Seidl/Seibold

1. Disturbance ecology 101 (R. Seidl)
2. The role of disturbances in forest ecosystem dynamics (R. Seidl)
3. Forest protection strategies in the course of time (S. Seibold)
4. Wind (R. Seidl)
5. Snow and ice (R. Seidl)
6. Fire (R. Seidl)
7. Drought (R. Seidl)
8. Functional roles of insects in forest ecosystems (S. Seibold)
9. Bark beetles – ecology (S. Seibold)
10. Bark beetles – management and impacts (S. Seibold)
11. Defoliators (S. Seibold)
12. Aphids, adelgids and others (S. Seibold)
13. Deadwood-inhabiting insects (S. Seibold)
14. Principles of disturbance management (R. Seidl)

### **Intended Learning Outcomes:**

On successful completion of the module, students are able to

- assess genetic diversity patterns in natural populations of different groups of organisms (mammals, birds, plants, fungi)
- understand the importance of maximizing genetic diversity
- understand the impact of biotic and abiotic factors on vitality and stability of individual trees and forests;
- understand the impact of fungal pathogens and insects on trees;
- apply their ecological knowledge to minimize and forecast the risk of damages by fungal pathogens;
- U explain the most important abiotic and biotic causes of tree death in forest ecosystems
- characterize forest disturbance regimes
- understand the different roles that disturbances play in forest ecosystems
- explain how plants adapt to different disturbance agents
- develop different disturbance management strategies.

### **Teaching and Learning Methods:**

Lectures and presentations: provide the theoretical population genetics and ecological background to understand the role of genetic diversity in general and the role of disturbance at population level and beyond.

Group work: will be used to learn how to assess and interpret genetic diversity patterns in various real world examples and to practice risk forecasting in disturbance management or develop disturbance management strategies.

Field trip (optional): to help understand the role of disturbance and genetic diversity in a real Bavarian forest setting.

**Media:**

lectures and presentations (pdfs)

**Reading List:**

Frankham, et al. 2017, Genetic Management of Fragmented Animal and Plant Populations, Oxford University Press; Allendorf et al. 2013, Conservation and the Genetics of Populations, Wiley-Blackwell; Agrios, G.N. 2005, Plant Pathology, 5th edition. Elsevier Academic Press, Oxford; Speight, M.R. & Wylie, F.R., 2001: Insect pests in tropical forestry. CABI publishing; Ruppert, E.E. & Barnes, R.D., 1993: Invertebrate Zoology 6th edition (Chapter 16 insects; p 825-862)

**Responsible for Module:**

Schäfer, Hanno; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Genetic Resource Management (Vorlesung, 2 SWS)

Benz J, Schäfer H

Disturbance ecology and management (Vorlesung, 2 SWS)

Seidl R [L], Seidl R, Seibold S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4082: Plantation Forestry and Agroforestry | Plantation Forestry and Agroforestry

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning outcomes are assessed by an oral examination (30 min). Based on specific problem statements the students have to demonstrate their ability to analyze and assess the situation, to understand the origin of the problem and to propose solutions adapted from the methodologies and techniques procured in the course.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

none

#### Content:

Plantation forestry: Background, Definitions, Plantations in the Context of International Forest Policy, Plantation Forestry Purposes, Plantation Silviculture, Management and Economics;  
 Agroforestry (AF): Introduction (global land-use problems, definitions, terminology), Traditional AF Systems, Environmental, economic and socio-cultural aspects of AF, Interactions in AF systems, Important tree groups in AF (NFT's, MPT's, Palms), Planning in AF, Legal aspects  
 Forest Management for Carbon Sequestration: Role of forests in the global carbon cycle, Possible impacts of climate change on forests, International climate policy, Forest in the Kyoto Protocol (KP), Flexible mechanisms of the KP, REDD and REDD+, Forest management options, Modelling forest sequestration with CO2FIX, Case studies.

#### Intended Learning Outcomes:

Students will be able to

- understand and evaluate the major issues of plantations in the context of international forest policy,

- explain the fundamental purposes of Plantation Forestry,
- properly deploy the essential techniques of Plantation Silviculture, e.g. for establishment, tending and maintenance
- critically examine plantation projects (management, work volume, economic results).
- understand the fundamental principles and practices of agroforestry land use,
- analyze the interactions among different components of an AF system,
- assess the ecological and economic effects of AF-systems and develop adequate management options,
- address problems in the context of rural development and identify AF-based solutions
- understand the role of forests and forest management activities in the global C-cycle,
- assess forest management options for different purposes within the framework of the international climate policy,
- identify and develop concepts for mitigation projects.

### **Teaching and Learning Methods:**

Knowledge and skills are imparted by lectures, group discussions, presentation of case studies and small exercises; the learning methods are learning, reviewing scientific articles, and research reference articles. The lectures will provide theories and basic reference materials which will be deepened and proved by reviewing articles. The achieved skills will be used to develop and discuss solutions for specified problems.

### **Media:**

PowerPoint presentations, case studies, additional reading material

### **Reading List:**

ABARE - JaakoPöyry (1999): Global Outlook for Plantations. Australian Bureau of Agricultural and Resource Economics (ABARE) Research Report 99.9, [www.abare.gov.au](http://www.abare.gov.au). Evans, J., Turnbull, J. W. (2004): Plantation forestry in the tropics. FAO, (1998): FRA 2000 - Terms and definitions. Forest Resources Assessment Programme, Working Paper 1. FAO (2001): Global Forest Resources Assessment 2000. FAO Forestry Paper 140. Pandey, D. and Ball, J. (1998): The role of industrial plantations in future global fibre supplies. *Unasylva* 193, Vol. 49, 37 - 43. Sawyer, J., (1993): Plantations in the Tropics. Smith, D.M., Larson, B.C., Kelty, M.J. and Ashton, P.M.S. (1997): The Practice of Silviculture: Applied Forest Ecology. Smith, J. (2002): Afforestation and reforestation in the clean development mechanism of the Kyoto protocol: implications for forests and forest people. *Int. J. Global Environmental Issues* 2 (3/4): 322-343. Shepherd, K.R. (1986): Plantation Silviculture. West, P. W. (2006): Growing Plantation Forests. Ashton, M.S. and Montagnini, F. (2000): The silvicultural Basis for Agroforestry Systems. *Agroforestry: Principles and Practice: Special issue of Forest Ecology and Management*, 45 (1991). Nair, P.K.R. (2012): Agroforestry, the future of global land use. Atangana et al. (2014): *Tropical Agroforestry*. Springer Verlag

### **Responsible for Module:**

Annighöfer, Peter; Prof. Dr.



**Courses (Type of course, Weekly hours per semester), Instructor:**

Plantation Forestry (Vorlesung, 2 SWS)

Annighöfer P [L], Annighöfer P

Agroforestry and Forest Management for Carbon Sequestration (Vorlesung, 2 SWS)

Annighöfer P [L], Annighöfer P, Thom D

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Wildlife and Protected Area Management | Wildlife and Protected Area Management

### Module Description

#### WZ4197: Protected Areas Biodiversity and Management | Protected Areas Biodiversity and Management

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Final written examination of 90 minutes in the field of protected areas biodiversity and its management to examine whether the students have understood the problematic of securing biodiversity in protected areas and are able to verify conservation measurements.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Successful completion of the 1st semester of the Master Program Sustainable Resource Management is recommended

#### Content:

Biodiversity and protected areas: A worldwide survey on ecozones and altitudinal belts of the world as carriers of natural biodiversity; protection of biological units; IUCN protected areas classification, the European FFH Directive as an example of a continent-wide tool for nature protection.

Habitat analysis and management: Habitat types, tools for protecting habitats, design of management plans, visitor management, best practice examples in sustainable biodiversity and habitat protection.

#### Intended Learning Outcomes:

On successful completion of the module students are able to:

- to put ecosystems and its utilisation options as well as its threats into a global perspective

- give clear options for further management, both regarding utilisation and protection

**Teaching and Learning Methods:**

Lecture, case studies, practical experiments / demonstrations, discussions.

**Media:**

PowerPoint Presentation.

**Reading List:**

Jürgen Schultz (2005): The Ecozones of the World: Ecological Divisions of the Geosphere. Springer, Berlin. 459p.

**Responsible for Module:**

Kühn, Ralph; Apl. Prof. Dr. agr. habil. ralph.kuehn@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Protected Area Management (Vorlesung, 2 SWS)

Kühn R [L], Gula R, Theuerkauf J

Biodiversity in Protected Areas (Vorlesung, 2 SWS)

Kühn R [L], Gula R, Theuerkauf J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4198: Wildlife Management and Wildlife-Human Interactions | Wildlife Management and Wildlife-Human Interactions

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Written assignment (ca. 15 pages) requiring review of literature, synthesis and integration of key concepts and findings from the literature to develop a coherent research proposal that clearly demonstrates knowledge in the field of species management and conservation strategies and of human dimensions as a research and applied field of study. Expected to read in advance where possible assigned readings so to be prepared for course lectures.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

This lecture combines contents of Wildlife Management and Wildlife Human Interactions. The key aspects are: 1) Principles of Wildlife Management & Wildlife Science, 2) Planning tools, 3) Case study: Strategic planning, 4) Conflicting views in WMT with case studies, 5) Basic Concepts in Ecology, 6) Reintroductions studies, 7) Global threats to Conservation, 8) Nature of human dimensions (HD) from a research perspective through various examples 9) Nature of various wildlife-human interactions from different perspectives, 10) Nature of public involvement and HD as an applied approach 11) Types of conflict, levels of planning and how to work with people toward solutions, 12) Understanding decision-making processes.

#### Intended Learning Outcomes:

After the course students are able to: understand important ecological concepts in wildlife management; understand the importance of the human dimension in wildlife management; analyse a conservation strategy for a species; apply wildlife management plans; evaluate species

and protected area management plans; understand the importance and nature of objectivity in conducting research and being a human dimension researcher; develop the ability to synthesize relevant literature pertinent to a research problem; organize ideas effectively and communicate these in a well-organized and developed written proposal.

**Teaching and Learning Methods:**

Lecture, video, group exercises, discussions

**Media:**

lecture notes, flip-chart/board, hand-outs, additional reading material

**Reading List:**

Sinclair et al. 2006, Wildlife Ecology, Conservation, and Management, ISBN 1-4051-0737-5 ;  
Krausman 2002, Wildlife Management, ISBN 0-1328-0850-1; Pullin 2002, Conservation Biology,  
ISBN 0-521-64482-8

**Responsible for Module:**

Kühn, Ralph; Apl. Prof. Dr. agr. habil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Wildlife-Human Interactions (Seminar, 2 SWS)

Kühn R [L], Bath A

Wildlife Management (Vorlesung, 2 SWS)

Kühn R [L], Rödl T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4189: Fisheries and Aquatic Conservation | Fisheries and Aquatic Conservation

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a 60 min. written exam (Klausur). In addition, the students need to prepare a 10-15 min. presentation in the practical exercise. Gradings from the examination and the presentation are weighed in the ratio 2:1. The examination means to measure the student's ability to assess anthropogenic influence on aquatic ecosystem functioning, evaluate the socioeconomic importance of fisheries and aquaculture, explain factors affecting susceptibility to and recovery from overexploitation, create and apply sustainable aquatic conservation tools and recall fisheries management tools for wild populations as well as of the underlying biological principles such as fish population dynamics. In the written examination students demonstrate by answering questions under time pressure and without helping material their theoretical and practical (e.g. application of methods) knowledge about fisheries management. For answering the questions, the students require their own wording. In the practical exercise the students prepare a presentation in form of a brochure, poster, video or podcast. For the presentation, the student is expected to demonstrate that he or she is capable of preparing a certain topic within a given time frame in such a way as to present or report it in a clear and comprehensible manner to specific target audiences in the context of fisheries and aquatic conservation.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Interest in aquatic biology, social sciences, conservation biology and management; this course can be selected independently from other courses in the fields of Fish Biology and Limnology at TUM

#### Content:

The module combines the theoretical background and the practical implementation of fisheries management and aquatic conservation. The key aspects are:

1. Introduction to fish, shellfish and fisheries management,
2. The socioeconomic importance of fisheries and aquaculture,
3. The functioning of aquatic ecosystems and the impacts of fisheries on aquatic ecosystem health,
4. Factors affecting susceptibility to and recovery from overexploitation,
5. Fisheries Management Tools for wild populations,
6. Aquaculture,
7. Aquatic Biodiversity Conservation,
8. Case study and knowledge transfer/communication exercise

### **Intended Learning Outcomes:**

At the end of the module students understand the importance of aquatic resources for mankind and the variables which influence ecosystem functions as well as the principles of aquatic biodiversity conservation. They are able to analyze the effects of natural and man-made disturbances in aquatic ecosystems (e.g. overexploitation) based upon an interdisciplinary understanding of methodological aquatic and fisheries biology, human dimensions, socioeconomic factors and management skills. In addition, students are able to objectively integrate knowledge from different disciplines (e.g. fish biology, conservation biology, commercial fishing techniques, aquatic habitat assessment and management) to evaluate sustainable resource management.

### **Teaching and Learning Methods:**

The module combines a lecture "Fisheries Management" with an accompanying practical exercise "Applied Aquatic Conservation". The lecture contents will be presented using lectures based on power-point presentation, group work and interactive role plays in order to combine The module combines a lecture "Fisheries Management" with an accompanying practical exercise "Applied Aquatic Conservation". The lecture contents will be presented using lectures based on power-point presentation, group work and interactive role plays in order to combine activating teaching methods with classic presentation techniques. In the accompanying practical exercise to the lecture the students will apply the gained theoretical knowledge by conducting case studies or participating research experiments with various content in the field of freshwater ecology and aquatic conservation. The content of the practical work is incorporated into running research projects at the chair (e.g. habitat restoration, artificial breeding programs, habitat assessment, conservation genetics). Additionally, the students learn to independently screen the respective literature in this field and learn methods in science communication.

### **Media:**

Form of presentation: lecture, case study, movie segment and practical exercise  
material: lecture notes, flip-chart/board, plus different materials for methodological/technical training

### **Reading List:**

1. King (2007) Fisheries Biology, Assessment and Management
2. Helfman (2007) Fish Conservation: A guide to understanding and restoring global aquatic biodiversity and fishery

resources

3. Moyle & Cech (2004) Fishes An introduction to Ichthyology

4. Primack (2008) A primer of conservation biology

**Responsible for Module:**

Geist, Jürgen; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Fisheries Management (Vorlesung, 2 SWS)

Geist J

Applied Aquatic Conservation (Übung, 2 SWS)

Geist J [L], Pander J, Zingraff-Hamed A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ6432: Wildlife and Conservation Biology | Wildlife and Conservation Biology

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 75	<b>Contact Hours:</b> 75

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a 60 min. written exam (Klausur). The examination means to measure the student's ability to assess anthropogenic influence on Biodiversity, to explain factors affecting Wildlife, to recall methods in Conservation Biology and applied Genetics and to evaluate Conservation Biology concepts. In the written examination students demonstrate by answering questions under time pressure and without helping material their theoretical and practical knowledge about Wildlife and Conservation Biology. For answering the questions, the students require their own wording. In the practical exercise the students present a case study and design a own research project proposal to practice their scientific communication skills and to transfer the theoretical knowledge to practical projects. Gradings from the Klausur and the Project work are weighed in the ratio 7:3.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Interest in Wildlife Conservation Biology and Nature Conservation. Basic background in Biology

#### Content:

The module combines the theoretical background and the practical implementation of Wildlife Conservation Biology, Conservation Genetics and Nature Conservation. The key aspects are:

1. Scope and tasks of Conservation Biology and applied Genetics
2. Biodiversity, Ecosystems, Ecosystem Services and Green Banking
3. Factors affecting terrestrial and aquatic Biodiversity
4. Methods in Wildlife Conservation Biology and applied Genetics
5. Conservation Biology concepts and strategies for natural population using international examples
6. Case studies and applied Nature Conservation, from theory to praxis

### **Intended Learning Outcomes:**

At the end of the module students understand the importance of Biodiversity of terrestrial resources and its interaction with human dimensions. They are able to apply and to evaluate Conservation Biology methods and strategies based upon an interdisciplinary understanding of species biology, conservation biology and applied genetics. In addition, students are able to integrate interdisciplinary knowledge into applied conservation management on a regional and international scale. They have an overview of applied interdisciplinary Nature Conservation management and are able to evaluate sustainable resource management strategies.

### **Teaching and Learning Methods:**

The module combines the lecture "Wildlife and Conservation Biology" with an accompanying practical exercise " Case Studies in Nature Conservation". The lecture contents will be presented using lectures based on power-point presentation and group work in order to combine activating teaching methods with classic presentation techniques. In the accompanying practical exercise, the students will apply the gained theoretical knowledge by conducting case studies (research programs), and presenting own concepts of research project in various content in the field of Wildlife Conservation Biology and Nature Conservation. Here the students learn to independently screen the respective literature in this field and learn methods in science communication.

### **Media:**

Form of presentation: lecture, case study, movie segment and practical exercise  
material: lecture notes, flip-chart/board, plus different materials for methodological/technical training

### **Reading List:**

1. Primack (2014) Essentials of Conservation Biology
2. Frankham (2010) Introduction to Conservation Genetics
3. Sutherland (2009) Conservation Science and Action

### **Responsible for Module:**

Kühn, Ralph; Apl. Prof. Dr. agr. habil.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Conservation Biology and Applied Genetics (Vorlesung, 2 SWS)

Kühn R

Case Studies in Nature Conservation (Übung, 3 SWS)

Kühn R, Stoeckle B

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Landscape Management | Landscape Management

### Module Description

## WZ4201: Vegetation Ecology and Geographical Information Systems | Vegetation Ecology and Geographical Information Systems

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

### Description of Examination Method:

A written exam (Klausur) assesses whether the students understand the basic concepts of spatial data analysis as well as vegetation ecology with respect to manage landscapes, the students' ability to apply these techniques to certain problems in landscape management as well as the students' ability to precisely describe solutions to achieve certain results within a limited amount of time.

A voluntary Mid-Term assignment (presentation) assesses the students' ability to communicate management plans based on vegetation and habitat data. It will serve for grade improvement by 0,3 according to §6 (5) APSO.

### Repeat Examination:

Next semester

### (Recommended) Prerequisites:

Basic knowledge in GIS, remote sensing, for example learned by attending the module "Inventory Methods and GIS". Basic knowledge of plant species.

### Content:

1. Advanced analysis and visualization of spatial data;
2. GIS based raster analysis;
3. GIS and satellite navigation;
3. Application of GIS in selected projects;
4. Introduction to the vegetation ecology, theory of plant distribution and of plantcommunities;
5. Methods of habitat mapping;
6. Habitat mapping in the field;

7. Field data analysis;
8. Management measures for management plans.

**Intended Learning Outcomes:**

At the end of the module students are able to:

- manage, analyze and visualize spatial data to solve problems related to landscape management;
- break down general problems in landscape management to tasks which can be solved by using a GIS;
- develop and communicate management plans based on vegetation and habitat data;
- ascertain and classify habitats.

**Teaching and Learning Methods:**

Theoretical explanation of certain topics followed by practical exercises using GIS software supported by screen animations.

Transfer of theoretical knowledge in lectures (vegetation ecology, habitat mapping), practical field work and presentation of proposals for landscape management measures.

**Media:**

GIS Software, PowerPoint Presentation

**Reading List:**

To be announced

**Responsible for Module:**

Döllerer, Martin; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

GIS (Landscape Management) (Vorlesung mit integrierten Übungen, 2 SWS)

Döllerer M

Vegetation Ecology (Vorlesung, 2 SWS)

Rojas Botero S, Döllerer M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2719: Landscape Planning | Landscape Planning

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The attainment of learning outcomes for the module will be assessed in a piece of research paper of around 10 pages in which students work independently on complex issues of contemporary landscape planning demonstrating their breadth of understanding in drawing out implications of their findings and putting them into a broader context. The written assignment is complemented by a presentation and/or a colloquium of around 30 min for assessing the capacity of the students to communicate their findings orally to an audience. Depending on the number of participants, research paper and accompanying talk may be prepared either individually or in groups.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic understanding of environmental systems; Module WZ2713 Methods of Scientific Communication. For the LP seminar, class discussion is a core element. Therefore, students are expected to take part and contribute to the discourse.

#### Content:

Concerned with the stewardship and enhancement of environmental systems, Landscape Planning is the key planning instrument for nature conservation and landscape management in Germany. The module introduces Landscape Planning and reflects on its potential contribution to sustainable land use with a focus on non-urban areas.

Course 1: Lectures will address the guiding principles, formal instruments and procedural elements of Landscape Planning; present methodological approaches for the assessment of landscape functions and ecosystem services including methods and tools for data collection, analysis and evaluation; illustrate target formulation and implementation strategies with examples from the planning practice.

Course 2: The seminar gives students the opportunity to deepen their knowledge by reflecting on readings and planning documents as well as by discussing in class such topics as: contemporary and emerging scientific theories and methodological approaches relevant for environmental planning; rationale of stakeholder involvement; context-dependency of spatial planning; comparison of current jurisdictional and institutional arrangements on landscape-related planning in the home countries of the students and their implications.

**Intended Learning Outcomes:**

Upon completion of the module, students are able to:

- recognize the purpose and objectives of Landscape Planning;
- explain instruments and procedural elements of contemporary Landscape Planning;
- select appropriate methods and tools to assess landscape functions and ecosystem services;
- be aware of the role of Landscape Planning in the decision-making upon the use of land;
- retrieve and interpret information from different sources;
- communicate key concepts relevant for environmental planning (both written and oral).

**Teaching and Learning Methods:**

Lectures provide subject specific knowledge; class discussions of selected readings engage students in critical thinking; in group work activities students experience the application of selected methods and tools.

**Media:**

Lectures, presentations, class discussions, small group exercises, assigned readings.

**Reading List:**

Haaren, C. v., Lovett, A. & C. Albert (2019): Landscape Planning with Ecosystem Services – Theories and Methods for Application in Europe. Springer Nature, Dordrecht. Additional material will be provided.

**Responsible for Module:**

Dr. Isabel Augenstein [i.augenstein@tum.de](mailto:i.augenstein@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Landscape Planning - seminar (Seminar, 2 SWS)  
Augenstein I

Landscape Planning - lecture (Vorlesung, 2 SWS)  
Augenstein I

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2737: Remote Sensing and Image Processing | Remote Sensing and Image Processing

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Achievements will be assessed by exercises, a presentation and a final report (project work). On behalf of home exercises the students get a first insight into concepts of image analysis. "Hands on" exercises with state of the art software packages are employed to train the main image processing steps and to assess the understanding of the students in implementing the basic concepts of remote sensing from data take to data analysis. Regular discussions with the tutor measure the student's ability to develop an idea from initial concepts to the complete picture within a given timeframe, delivering interim results at relevant milestones (35%). On behalf of a presentation of a topic related to remote sensing the student's ability to understand a technical/scientific subject, to analyze and evaluate facts and factors of influence, to summarize the subject and present it to an audience, and to conduct a discussion about the presented subject is assessed. With the final report the students demonstrate that they have gained deeper knowledge of the specific image analysis software packages and its components, of differing analysis concepts and that they are prepared to evaluate an existing situation as imaged by the respective remote sensing data set. They demonstrate further that they are able to create new geodata layers appropriated to be analyzed in an integrating GIS environment (65%). The grade weights of module examination components correspond to the weighting factors given in brackets.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Module "Inventory Methods and GIS" of the 1th semester of the Master Program "Sustainable Resource Management" passed, computer skills at least at working level .

### **Content:**

The implementation of data interpretation and information extraction concepts and techniques is trained "hands on" with the help of advanced image processing and analysis programs. Topics: 1. Introduction to image processing concepts; 2. Implications of air- and space borne data takes; 3. Data types: Digital aerial photographs, high to very high resolution multispectral and hyperspectral scanner data, LIDAR data; 4. Development of interpretation keys; 5. Exercises on data pre-processing; 6. Unsupervised and supervised classification concepts, pixel-based, object based classification strategies; 7. Exercises on land use/land cover classification; 8. Basic verification concepts; 9. Exercises on the extraction of bio-geo-chemo-physical parameter from RS data; 10. Change detection concepts; 11. Interrelation of Remote Sensing with GIS; 12. Access and data download from geodata provider.

### **Intended Learning Outcomes:**

At the end of the Remote Sensing and Image Processing module (RSIP) the students are able to:

- decide which data set is most appropriated to solve his thematic task, - access data bases, download and open a data set for image processing, - geocode/georeference digital data sets,
- develop appropriated interpretation keys fitting the data set and the targeted thematic goal,- visualize and enhance the data set for interpretation, - extract spectral signatures, - calculate indices on behalf of the data,
- learn how to extract bio-geo-chemo-physical parameter from the data set, - perform unsupervised and supervised classifications, - proof the quality of the results by an accuracy assessment, - perform a change detection study, - export the results as GIS layer.

### **Teaching and Learning Methods:**

By using advanced image processing software packages the theoretical explained concepts are exercised "hands on" and discussed on basis of different data types applying the "just in time teaching (JiTT)" technique; the practical courses are prepared by homework (presentation of specific related topics, exercises); the short presentations will be given during the courses, contents, layout and style discussed and narrated; the home exercises explained in close relation to the computer exercises just done. The definition of the problem to be solved by image analysis techniques and the development of appropriated solutions needs research of reference materials. The final outcome of the courses, the classification result, will be used as basis for the Module "Application Study" of the concentration field "Landscape Management".

### **Media:**

Image processing software and tutorials, prepared exercises, different data types

### **Reading List:**

The literature recommended within the Modules "Inventory Methods and GIS", "Remote Sensing and Image Processing", [www.wiau.man.ac.uk/courses/cvmsc/Terminol.htm#SplitMerge](http://www.wiau.man.ac.uk/courses/cvmsc/Terminol.htm#SplitMerge); [http://www.pfc.cfs.nrcan.gc.ca/landscape/inventory/wulder/large\\_area\\_rs/index.html](http://www.pfc.cfs.nrcan.gc.ca/landscape/inventory/wulder/large_area_rs/index.html); <http://www.pfc.cfs.nrcan.gc.ca/landscape/inventory/wulder/hirespres.html>; Uni Zürich, RSL: <http://www.geo.unizh.ch/rsI2/>; EARSeL: <http://www-earsel.cma.fr/>; <http://www.ccrs.nrcan.gc.ca/ccrs/>



eduref/tutorial/indexe.html; <http://observe.ivv.nasa.gov/nasa/education/reference/main.html>; <http://rst.gsfc.nasa.gov/starthere.html>

**Responsible for Module:**

Mengesha, Mengistie Kindu; Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Remote Sensing and Image Processing (Vorlesung, 6 SWS)

Mengesha M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4094: Landscape Management - Application Study | Landscape Management - Application Study

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 75	<b>Contact Hours:</b> 75

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment is based on a project work: 1. the participation intensity on discussions and the quality of the contributions during the courses; 2. the demonstrated skills in creating new data layers by combining existing data from official sources (administrations, organizations, etc.) using GIS techniques, in exploring new data and information layers (RS, vegetation ecology), etc. 3. the contribution in developing the project (planning competences); 4. the presentation style, contents and layout; 5. the team work; 6. the project report.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

The successful completion of the modules "Inventory Methods and GIS", "Remote Sensing and Image Processing", "Geographical Information Systems and Vegetation Ecology" and "Landscape Planning" or equivalent skills are required, courses on scientific writing and reporting recommended.

#### Content:

1. Implementation of GIS and RS techniques.
2. Implementation of theoretical concepts of Vegetation Ecology;
3. Implementation of theoretical concepts of Landscape Planning;
4. Oral presentation of findings;
5. Elaboration of a final report.

#### Intended Learning Outcomes:

At the end of the module the students are able to develop or at least to contribute to a landscape management project. More in detail the students are able to:

- work in a team;
- apply the theoretical and practical skills in vegetation ecology, landscape planning, remote sensing and GIS techniques;
- contribute to context-dependant landscape-related planning;
- deliver an oral presentation to communicate their findings;
- prepare a convincing project report using supporting data to back their statements in accordance with guidelines for scientific writing.

**Teaching and Learning Methods:**

Prime characteristic of the Application Study is the self-organized group work by the students to reach the defined objective of the project assignment. Progress of the team is supported by group discussions, theory input and coaching provided by lecturers on demand.

**Media:**

Scripts and reports of the above listed lectures and exercises offered within the elective field; basic data sets to develop the application study (GIS, RS, etc.); additional information on request and up on necessity (project driven).

**Reading List:**

The literature recommended within the Modules "Inventory Methods and GIS", "Remote Sensing and Image Processing", "Geographical Information Systems and Vegetation Ecology" and "Landscape Planning" should be used.

**Responsible for Module:**

Döllerer, Martin; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Landscape Management - Application Study (Vorlesung mit integrierten Übungen, 5 SWS)

Augenstein I, Döllerer M, Mengesha M, Teixeira Pinto L

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Renewable Resources | Renewable Resources

### Module Description

#### **WIB14002: Advanced Seminar Life Sciences, Management & Policy: Sustainable Entrepreneurship - Theoretical Foundations | Advanced Seminar Life Sciences, Management & Policy: Sustainable Entrepreneurship - Theoretical Foundations**

Version of module description: Gültig ab summerterm 2017

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### **Description of Examination Method:**

The grading is based on a research paper (max. 7.500 words). The students show that they are able to apply theoretical perspectives to the context of life sciences. Moreover, they develop an argument matching the concept of sustainable entrepreneurship as a promising approach for addressing complex sustainability issues in general and in the field of life sciences in particular. In the research paper students show that they can evaluate different approaches and develop their own ideas for life science-related sustainable ventures.

#### **Repeat Examination:**

Next semester

#### **(Recommended) Prerequisites:**

Courses in entrepreneurship, corporate sustainability and/or sustainability marketing are recommended.

#### **Content:**

Whether it is tackling climate change, resource degradation or social inequalities - responding to sustainability issues constitutes the biggest challenge for businesses in the 21st century. Embracing a great range of industries including food, energy or textiles, the field of life sciences is a key area for sustainability. Since the production of these goods accounts for an extensive use of resources, there is great potential for effecting real improvements on a way towards more sustainable production and lifestyles. The course "Advanced Seminar Life Sciences and Management" will investigate this exciting and ongoing industrial transformation. It will deal with

the following topics (all topics will be explained in general and then discussed in the context of life sciences in particular):

- 1) Introduction to Sustainability and Entrepreneurship
- 2) Sustainable Entrepreneurship
- 3) Opportunity Identification
- 4) Development of Double and Triple Bottom Line Solutions
- 5) Forming and Funding of New Sustainable Ventures
- 6) Market Entry
- 7) Sustainable Entrepreneurship and Life Sciences - Reflections and Discussion

**Intended Learning Outcomes:**

Upon successful completion of this module, students will be able to (1) summarize and (2) evaluate the socio-economic problems society is facing. They will (2) match the concept of sustainable entrepreneurship as a promising approach for addressing complex sustainability issues in general, and in the field of life sciences in particular. More specifically, students will (3) be able to identify the venture creation process from opportunity identification to market entry in the context of sustainability and life sciences. In addition, participants will be able to (4) apply this knowledge to the field of life sciences. Finally, the students will be able to (5) critically evaluate case studies from the field of life sciences and to (6) create own ideas for sustainable ventures in this context.

**Teaching and Learning Methods:**

The module is a seminar which intends to familiarize the student with the relevant literature and follows an interactive course format with group work assignments and guest lectures. This is the appropriate format for this advanced level module because it encourages the students to go into further detail and to deal with the issues in an integral, interactive and independent way.

**Media:**

Presentations, slides, cases, links and further literature will be provided via [www.moodle.tum.de](http://www.moodle.tum.de)

**Reading List:**

Muñoz, P., & Cohen, B. (2018). Sustainable entrepreneurship research: taking stock and looking ahead. *Business Strategy and the Environment*.

The module is based on key scientific papers on each topic. These form the basis for classroom discussions and are to be used for developing an argument in the reflection essay. All articles are provided as pdf files in TUM Moodle (<https://www.moodle.tum.de>).

**Responsible for Module:**

Belz, Frank-Martin; Prof. Dr. oec.

WIB14002: Advanced Seminar Life Sciences, Management & Policy: Sustainable Entrepreneurship - Theoretical Foundations | Advanced Seminar Life Sciences, Management & Policy: Sustainable Entrepreneurship - Theoretical Foundations

**Courses (Type of course, Weekly hours per semester), Instructor:**

Advanced Seminar Life Sciences, Management & Policy / Innovation & Entrepreneurship

(WIB14002): Sustainable Entrepreneurship - Theoretical Foundations (Limited places) (Seminar, 4 SWS)

Belz F, Salvi E

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2720: Renewable Energy Technologies | Renewable Energy Technologies

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a written test, where the students have to prove that they understand and remember the basic technical principles related to energy production and the working principles of the presented renewable energy technologies, as well as the related ecological and economical properties and frame conditions. The students have to answer questions, but may also be asked to do calculations, complete figures or prepare sketches.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

General understanding of natural science, mathematics and basics of technology.

#### Content:

The course provides an overview of the basics of thermodynamics and the principles of energy conversion. Energy conversion and its importance for the economy is discussed. Because of their transitional character due to the German "Energiewende", the course focusses on the European and German energy systems. The international students in the course are expected to support the lecture with their experiences from abroad.

Basic technical principles of energy production, efficiencies, costs and environmental impacts will be understood. The focus lies on the following areas: solar, wind, water and geothermal energy conversion.

The course provides an overview of the basics of thermodynamics and the principles of energy conversion. Energy conversion and its importance for the economy is discussed. Because of their transitional character due to the German "Energiewende", the course focusses on the European and German energy systems. The international students in the course are expected to support the lecture with their experiences from abroad.

Basic technical principles of energy production, efficiencies, costs and environmental impacts will be understood. The focus lies on the following areas: solar, wind, water and geothermal energy conversion.

In order to complete the picture, also storage and fossil fuel technologies will be discussed. The students will understand their role and their contribution to balancing energy production and demand.

**Intended Learning Outcomes:**

At the end of the course, the students understand the technical principles of renewable energy conversion systems.

They are able to interpret energy scenarios and solve simple problems associated with a high renewable energy share and its implications on society.

The students can estimate the importance of distinct technologies for a sustainable energy supply.

**Teaching and Learning Methods:**

Lecture with integrated exercises and teamwork, as well as discussions to improve understanding.

**Media:**

Power point presentation, black board, Videoclips

**Reading List:**

Tba

**Responsible for Module:**

Benedikt Schweiger (benedikt.schweiger@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Renewable Energy Technologies (Vorlesung, 4 SWS)

Schweiger B [L], Kerscher F, Schiffler C, Schweiger B

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ2721: Agriculture Raw Materials and their Utilization | Agriculture Raw Materials and their Utilization [ARM&U]

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module grade is assessed by a written exam (60 min). The students show that they have understood the principles of biomass production for bioenergy use, biomass supply chains, and the different bioenergy systems. The written exam demonstrates the student's ability to deal with questions, and calculations, complete figures or prepare sketches in regard to biomass production for bioenergy use.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

General understanding of natural science, mathematics and basics of technology.

#### Content:

The targets for the module "Agriculture Raw Materials and their Utilization" are impart a basic understanding of the possibilities and limitations for the agricultural production of biomass for energetic and industrial uses and to provide an overview of ecological impacts of diverse biomass and bioenergy utilization pathways.

The module comprises a lecture which deals with the following topics:

- Production of agricultural biomass and the most important energy and industry crops
- Biomass chains and uses
- Diverse bioenergy systems
- Bioeconomy & biorefineries (related to Agricultural products)

Ecological impact assessment of biomass and bioenergy utilization.

**Intended Learning Outcomes:**

At the end of the module students have acquired knowledge of the production and utilization of renewable resources from the agricultural and forestry sector.

They know how to analyze the performance and ecological impacts of different biomass supply and utilization chains. They can estimate the suitability of various crops for bioenergy use. The students have an insight in the physical and chemical basics of energy production from biomass and are able to apply related basic equations. They can compare different biomass combustion systems and attribute emissions. The students know the production pathways and properties of different biofuels for transportation and are able to estimate their future potentials. They understand the technological background of biogas production and can do basic designs of biomass supply and utilization chains using the example of biogas systems in agriculture.

**Teaching and Learning Methods:**

The lecture with integrated exercises and discussions will improve the understanding. During the lecture a power point presentation related to the lecture topics will be done from each student to improve the discussion in the different topics of the module.

**Media:**

Power point presentations, black board. Videos, Online Quiz.

**Reading List:**

Hijazi, O; Munro, S; Zerhusen, B; Effenberger, M. (2016): Review of life cycle assessment for biogas production in Europe. Renewable and Sustainable Energy Reviews (54), 1291-1300.

**Responsible for Module:**

Hijazi, Omar; Dr. rer. agr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Agriculture Raw Materials and their Utilization (Vorlesung, 4 SWS)

Hijazi O

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4098: Forestry Raw Materials and their Utilization | Forestry Raw Materials and their Utilization

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning success will be assessed by a written examination (duration 60 min) where students are expected to demonstrate the level of knowledge and their ability to use and apply it in solution finding strategies. Additionally a midterm Assignment (voluntarily), the students have to prepare and give a structured oral presentation in a seminar organized at the end of the summer term. The topic of the presentation is defined in agreement with the lecturer. The presentation may be prepared either individually or in groups of two. The midterm presentation Assignment allows to improve the examination mark by 0.3.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basics of biology, chemistry, physics and sciences to deal with the biological production, and the processing and conversion processes of wood to final products, and the environmental assessment.

#### Content:

1. Overview and global potential of forest resources;
2. Availability, characteristics and properties of forest based products (wood and non-timber forest products);
3. Technologies and processes from raw materials to final products: sawn timber, wood-based products, pulp and paper;
4. Criteria and rules of a resource efficient application;
5. Environmental assessment of forestry raw materials and products.

### **Intended Learning Outcomes:**

Upon successful completion of the module students are able to:

- illustrate the multidisciplinary of forests and their products;
- propose options to maximize the value chains of forest based products;
- exemplify production and process technologies and typical sector industries;
- demonstrate the role, potential and limitations of forestry raw materials in the framework of sustainable development;
- outline economical, environmental and social aspects of typical products and applications;
- develop strategies to strengthen the value and impact of typical forestry raw materials and non-timber forest products.

### **Teaching and Learning Methods:**

Lecture, exercises, seminar, Optional: visits to laboratories and industry.

### **Media:**

Demonstration material: raw materials and products; PP presentations; videos.

### **Reading List:**

Fengel, D.; Wegener, G. (2003): Wood - Chemistry, Ultrastructure, Reactions. Kessel Publishers  
Dinwoodie, J.M. (2000): Timber: Its nature and behaviour. Van Nostrand Reinhold Publishers  
Forest Products Laboratory (ed) (2010): Wood as an Engineering Material: <http://www.fpl.fs.fed.us-documents-FPLGTR-fplgtr.113-PL113.htm>.  
Rowell R. ed. (2012): Handbook of Wood Chemistry and Wood Composites. Sec. Edition, CRC Press Taylor & Francis Group, 703 pp.  
Shmulsky, R., Jones P.D (2011): Forest Products & Wood Science, 6th ed. Wiley-Blackwell, Chichester UK

### **Responsible for Module:**

Prof. Dr. Klaus Richter – Lehrstuhl für Holzwissenschaft Winzererstr. 45, 80797 München, Tel.: 089/ 2180 - 6421, [richter@hfm.tum.de](mailto:richter@hfm.tum.de)

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Forestry Raw Materials and their Utilization (Übung, 2 SWS)

Richter K, Sanchez-Ferrer A, Khaloian Sarnaghi A

Forestry Raw Materials and their Utilization (Vorlesung, 2 SWS)

Richter K, Sanchez-Ferrer A, Khaloian Sarnaghi A, van de Kuilen J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4202: Political and Social Perspectives of Renewable Resources | Political and Social Perspectives of Renewable Resources

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Oral presentation of the group project work, review paper for a scientific journal. The learning outcomes are assessed by a group project work concerning a selected topic related to the political and social perspectives of renewable resources. Therefore students have to prepare a scientific paper for an international journal of their choice and give a short oral presentation about the work done for the paper, similar to what would be expected in a 15 minute conference presentation.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Knowledge of sustainable resources (materials and energy). Scientific writing.

#### Content:

In the lectures a number of examples of societal aspects of Sustainable Resource programs will be presented and discussed. Backgrounds are global developments such as urbanization, the rise of countries like China and India, resource availability and technological developments. Case studies deal with tropical forestry and pros and cons of tropical hardwood uses, urban planning, vernacular architecture and the use of renewable resources. We take a tour around the world and look at social housing programs in Europe, Brazil and South-East Asia. Furthermore we look at successes and failures in the German/European energy policies in comparison to the United States.

#### Intended Learning Outcomes:

After this course, students should be able to:

1. Develop SR stimulation programs on country or regional level and priority analysis of renewable resource applications
2. Assess priorities for development and application of renewable resources in countries with different levels of development
3. Critically analyze existing SR programs taking into account social values of stakeholders,
4. Assess impacts of global developments such as urbanization and UN-policies on SR.

**Teaching and Learning Methods:**

Discussion and creativity sessions. Project work evolving in a scientific paper for a journal of choice. Oral presentation.

**Media:**

Lectures, UN-policy notes, Discussion and Creativity sessions.

**Reading List:**

Tba

**Responsible for Module:**

van de Kuilen, Jan Willem; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Political and Social Perspectives of Renewable Resources (Vorlesung, 4 SWS)

van de Kuilen J [L], van de Kuilen J, Khaloian Sarnaghi A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### EI70860: Integration of Renewable Energies | Integration of Renewable Energies [IRE]

Version of module description: Gültig ab summerterm 2020

<b>Module Level:</b> Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module exam consists of a written exam (60 min). The goal of the exam is to test with questions if the students are able to reproduce general challenges regarding the integration of renewable energies. With calculations on simple examples the capability of working with this general knowledge on specific questions is tested. The exam will be graded.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Fundamental knowledge in:

- renewable energy technologies (hydro, wind, photovoltaic, biomass, geothermal)
- power generation and transportation in large quantities in future energy supply scenarios
- fossil and renewable energy carriers
- regulation frameworks in electricity markets
- political and social aspects in energy systems

#### Content:

The lecture is subdivided in an introduction and three main chapters (physical, system and market integration), which classify the different challenges of the integration of renewable energies in an existing electricity system:

The introduction discusses the characteristics of fluctuating power generation from renewable energies and derives the resulting challenges for the system.

Physical integration discusses (technical) options, which enable an adaption of the generation side and the demand side (grid, storage, demand side integration, etc.).

System integration evaluates the possible contribution of renewable energies to provide ancillary services (balancing power, reactive power, inertia, etc.).

Market integration explain the influence of an increasing share of renewables on the existing market participants and discusses alternative framework design options.

**Intended Learning Outcomes:**

Upon successful completion of the module, students are able to:

- describe the challenges of a power system with a high share of renewable energies
- understand the properties of renewable energies from a system perspective
- analyze possible options to improve the integration of the renewable energies
- understand the system behavior of renewable energies
- analyze the influence of renewable power generation on operation of the conventional power plant park
- assess renewable power generation in relation to electricity markets and the demand of balancing power

**Teaching and Learning Methods:**

Lecture: beamer and partly blackboard presentations with teacher centered teaching

Tutorials: Calculations (by hand or PC based) as well as reading assignments which are both discussed in lessons

Language of instruction, English in Winter Semester and German in Summer Semester.

**Media:**

Lecture and exercise with beamer and blackboard. Presentations and exercise will be presented online.

**Reading List:**

Lawrence E. Jones, Renewable Energy Integration, 2017

IEA: The Power of Transformation, 2014

**Responsible for Module:**

Hamacher, Thomas; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Integration of Renewable Energies (Vorlesung mit integrierten Übungen, 4 SWS)

Kuhn P, Gawlick J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Climate, Air and Water | Climate, Air and Water

### Module Description

## WZ2731: Hydrometeorology and Management of Water Resources | Hydrometeorology and Management of Water Resources

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning outcome will be assessed by an oral examination (30 min) in which students should demonstrate their profound understanding of water management and ability to analyze and evaluate key issues and challenges. They should exhibit the capability of identifying and solving problems in a concise way and show that they can express themselves in a clear and scientific manner. A voluntary mid-term assignment (presentation) in the seminar assesses the students' ability to communicate and present an integrated management study case in one selected topic in sustainable water management. It will serve for grade improvement by 0.3 according to §6(5) APSO.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in chemistry and physics.

#### Content:

- Hydrometeorology (including hydrological cycles, precipitation-, run off-, evapotranspiration - process of formation, measurement, global and regional spatial and temporal patterns, influences by land use land cover change, climate change scientific basis, climate change impacts, adaptation, vulnerability in water resources).
- Problems in water management according to too little water, too much or too dirty. Different aspects of water augmentation (e.g. harvesting, desalination, translocation), water conservation (irrigation, pricing, household, ...), water management processes (e.g. IWRM, virtual water) are discussed by practical examples;

**Intended Learning Outcomes:**

Upon the successful completion of this module the students are able to understand the basics of hydrology, and the influence of climate change on hydrological processes and management. They are able to analyze and classify various problems in water resource management and to assess the suitability and applicability of different management practices in the field of water augmentation (e.g. rain water harvesting, fog nets, dams) and water saving strategies (e.g. in irrigation, sanitation) to integratively solve water-resource-problems.

**Teaching and Learning Methods:**

The basics of hydrology and meteorology are presented and discussed in a lecture with thorough explanations. Some simple case studies are used to introduce into the theoretical background (e.g. meteorological instruments at the meteorological platform). Student presentations and discussions, group work in the seminar.

**Media:**

PowerPoint presentations; Presentation notes supporting the lecture. Case studies.

**Reading List:**

Ahrends (2000) Meteorology today, 7th edition. Jones JAA (2010) Water Sustainability - A Global Perspective, Hodder Education London. Clarke R & King J (2004) The atlas of water. Figueres C. et al. (2003) Rethinking water management. Wescoat JL et al. (2003) Water for life, water management and environmental policy. Grambow M (2008) Wassermanagement.

**Responsible for Module:**

Prof. Dr. Annette Menzel - Professur für Ökoklimatologie Hans-Carl-von-Carlowitz-Platz 2, 85354 Freising, 08161/ 71-4740, amenzel@wzw.tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Management of Water Resources (Vorlesung, 2 SWS)  
Estrella N, Menzel A

Introduction to Hydrometeorology (Vorlesung, 2 SWS)  
Menzel A [L], Menzel A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2722: Mountain Catchments under Changing Climate | Mountain Catchments under Changing Climate

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In a written exam, students demonstrate that they have gained an understanding of hydrological processes and that they are able to apply and run a hydrological model for a mountain catchment. By an 10min oral presentation and a 5min discussion via Live-Stream (ZOOM) the students' ability to understand selected hydrology-related threats for mountain catchments and to scientifically analyze and evaluate important influencing factors, to present it to an audience, and to conduct a discussion about the presented subject in a clear and concise scientific manner is assessed. The final grade is an averaged grade from the presentation (65%) and the written exam (35%).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Introduction in Hydrometeorology and management of water resources.

#### Content:

In the Field Course Applied Hydrometeorology of Mountain Catchments we will visit selected research stations, field sites, hydrological infrastructure, restoration sites, and protected areas in the Munich PreAlpine and Alpine area and learn more about hydrology-related threats for mountain catchments ranging from Glacier melt to Munich's drinking water. Sites include e.g. Environmental Research Station Schneefernerhaus, KIT Alpine Campus Garmisch, Waldklimastation Kreuth, Sachenbach catchment, Versuchstation Obernach, Sylvensteinspeicher, Walchenseekraftwerk, Versuchsstation Wielenbach, Mangfall / Lech Wassereinzugsgebiet.

The Hydrological Modeling course includes:

- 1) Dominant hydrological processes in mountain catchments: Precipitation types, runoff generation, concentration and flood routing
- 2) Data in mountain catchments: Availability, quality, acquisition and analysis

- 3) Types of hydrological models
- 4) Generation, parameterization and calibration of the process based hydrological model WaSiM
- 5) Model sensitivity analyses with focus on meteorological input and land use scenarios.

**Intended Learning Outcomes:**

After completion of the module, the students understand the main processes in mountain catchments like runoff generation, runoff concentration and flood routing processes. Additionally, they are able to use a physically based hydrological model to simulate the rainfall runoff process in mountain catchments and its influencing parameters caused by the special circumstances of these regions in a widely realistic and transparent way. The students are able to generate event based scenarios as well as land use scenarios and understand recent hydrology-related threats for mountain catchments as well as the influence of climate change on hydrological processes and management in mountain areas. They remember suitable monitoring and risk prevention strategies and are able to analyze, evaluate and communicate (both oral and written) a specific case study or research questions related to the experimental sites visited to a general audience.

**Teaching and Learning Methods:**

Teaching methods include lecture as well as practical exercises at PC laboratory in respect to hydrological modelling, a week of field trip to Alpine and pre-alpine areas to the listed sites with guided tours by local scientists, administrators, TUM lectures as well as short presentations by the students.

**Media:**

PowerPoint Presentation, Hydrological model (e.g. WaSiM), Field work

**Reading List:**

IPCC (2013) Fifth Assessment Report; Shelton ML (2009): Hydroclimatology - Perspectives and Applications; IPCC (2008) Technical Paper VI on Climate Change and Water

**Responsible for Module:**

Responsible for Module: Prof. Dr. Annette Menzel - Professur für Ökoklimatologie Hans-Carl-von-Carlowitz-Platz 2, 85354 Freising, 08161/ 71-4740, menzel@wzw.tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Introduction in Hydrological Modelling (Vorlesung, 2 SWS)  
Chiogna G

Field Course in Applied Hydrometeorology (Vorlesung mit integrierten Übungen, 3 SWS)  
Menzel A [L], Kloos S, Lüpke M, Menzel A  
For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2732: Environmental Monitoring and Data Analysis | Environmental Monitoring and Data Analysis

Version of module description: Gültig ab summerterm 2023

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 75	<b>Contact Hours:</b> 75

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Upon completion of the module, the students have a profound understanding of key aspects of environmental monitoring and are able to choose appropriate as well as to efficiently run environmental measurements, to reproducibly analyze acquired data and to clearly communicate results of environmental measurements.

The examination of the module will be in the form of a written examination (Klausur, 180 min); which consists of two sub parts: first a written part (40%, approx.60 minutes) on monitoring concepts and second a programming part on handling environmental monitoring datasets (60%, approx. 120 minutes).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in R is recommended.

#### Content:

1 Environmental monitoring including principles, techniques and management issues used in environmental monitoring and assessment; Observing, recording, communicating and archiving collected data and providing it to project stakeholders in order to identify sustainable and responsible environmental practices.

Optional: short course Aerobiology, GAW program, visit of companies

2 Environmental data analysis

Introduction to data analysis with R; Principles of reproducible research and implementation with R; Pipelines for environmental data analysis from obtaining data via cleaning and transforming to modelling and visualization with modern R; Coverage of data retrieval from different storage types for climate, proxy, phenology, and other data (text- based, netCDF, data bases); Modeling and visualization as complementary strategies for hypothesis-driven data analysis, based on published research from different fields of environmental sciences

**Intended Learning Outcomes:**

After this module, the students can plan, implement and run environmental measurements. They are able to efficiently analyze environmental data sets, including download and import of data sets and visualization and modelling with R.

**Teaching and Learning Methods:**

Course 1 is a combined lecture and exercise sessions where students will work on applied case studies and exercises related to environmental / meteorological monitoring.

Course 2 then offers combined lecture and exercise sessions at the PC lab on how to efficiently analyze those environmental data sets of course 1.

**Media:**

PowerPoint Presentation, Field work, Interactive documents for data analysis

**Reading List:**

Beginner level tutorials for Swirl (<http://swirlstats.com/>)

**Responsible for Module:**

Menzel, Annette; Prof. Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Environmental monitoring and data analysis; ecological data analysis (Vorlesung mit integrierten Übungen, 3 SWS)

Menzel A [L], Buras A

Environmental monitoring and data analysis; ecological monitoring (Vorlesung mit integrierten Übungen, 2 SWS)

Menzel A [L], Lüpke M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2730: Climate Change - Science, Impacts and Adaptation, Mitigation | Climate Change - Science, Impacts and Adaptation, Mitigation

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Assessment consisting of oral examination (30 min) on the lecture and the seminar. In this oral examination the student is expected to demonstrate that he/she has understood the physical basis of the climate system and that they can identify the drivers of climate change. The student shows that he/she is able to apply his/her knowledge to develop adaptation and mitigation measures and to argue in discussions on climate change issues. A voluntary mid-term assignment (presentation) in the seminar assesses the students' ability to summarize findings from scientific publications / case studies and to present them to an audience. The presentation is complemented by the preparation of a "PICO" that is presented on an interactive screen. The presentation will serve for grade improvement by 0.3 according to §6(5) APSO.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in meteorology, physics, biology.

#### Content:

Based on the newest IPCC report (AR 5) the theoretical background on the physical science basis of climate change, theory and practical application of adaptation and mitigation measures in biological, physical and chemical systems will be presented. In a related seminar, selected topics will be intensified in case studies. TUM as a NGO in the UNFCCC process offers an optional possibility also for students to take part in COP and related negotiations.

#### Intended Learning Outcomes:

After this module, the students can understand the physical basis of the climate system, identify all drivers of climate change and falsify common arguing of "climate sceptics". They can summarize

observed changes in the climate system as well as impacts in diverse systems and regions. They are able to assess cross-sectorial impacts of climate change in selected areas, to evaluate and develop adaptation and mitigation measures and strategies in biological, physical and chemical systems including an analysis of their effectiveness and cost-effectiveness.

**Teaching and Learning Methods:**

Lecture on physical basis of the climate system, impacts of climate change and important mitigation strategies. In the seminar group presentations of various topics regarding adaptation and mitigation of climate change will be presented as case studies. Optional excursion to UNFCCC meeting if applicable.

**Media:**

Lecture with PowerPoint Presentation, reader and exercises. Group work in seminar including problem driven case studies and student presentations, excursion.

**Reading List:**

IPCC (2013) Fifth Assessment Report of WGI, II, III. Houghton (2015) Global warming, the complete briefing. Most recent scientific literature.

**Responsible for Module:**

Rammig, Anja; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Ecological, social and economic aspects of CC impacts, adaptation and mitigation on different scales (Seminar, 2 SWS)

Estrella N [L], Menzel A, Estrella N

Climate Change - The complete briefing (Vorlesung, 2 SWS)

Rammig A [L], Buras A, Krause A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ2733: Introduction to Soil Science | Introduction to Soil Science

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In a written exam of 60 minutes duration, the students demonstrate by answering questions without helping material their understanding of the nature and properties of soils, and they remember the characteristics of the soils of the field course as well the field assessment methods. In a pass/fail exam (laboratory assignment) in the field of 10 minutes duration, they prove their ability to survey and interpret a soil profile.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in chemistry, physics, and biology.

#### Content:

- What is a soil?
- Mineral (inorganic) soil components
- Soil biology and soil organic matter
- Soil chemistry
- Soil physics
- Soil-forming processes
- Soil survey
- Soil interpretation
- Soil erosion assessment

#### Intended Learning Outcomes:

The students understand the basics of soil science. They can use their knowledge from soil mineralogy, soil organic matter, soil chemistry, and soil physics to understand soil formation

processes and important biochemical and physical properties. The students are able to survey a soil profile and to detect the genesis of the surveyed soil. They can evaluate the possibilities of soil use, the risks to the soil itself and the risks to its environment. They are able to evaluate the hydrology of the soil and to judge the erosion risk.

**Teaching and Learning Methods:**

The lecture discusses the essentials of soil science. The field assessment starts with peer instructions to analyse a soil profile. During the course, the students will do more and more group work to train the evaluation of a soil profile, its hydrology and its erosion risks.

**Media:**

Lecture: presentation notes. Field Assessment: spade, auger, knife, colour charts, TDR probes, suction cups, erosion assessment kits.

**Reading List:**

Brady, Weil: The nature and properties of soils, 14th edition, 2007.

Blume et al.: Scheffer/Schachtschabel Soils Science, 2016.

Eash, Sauer, O'Dell, Odoi, Bratz: Soil science simplified, 6th edition, 2016.

Blum, Schad, Nortcliff: Essentials of Soil Science, 2016.

FAO Guidelines for Soil Description. Prepared by Jahn, Blume, Asio, Spaargaren, Schad, 2006.

**Responsible for Module:**

Schad, Peter; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Introduction to Soil Science: Lecture (Vorlesung, 2 SWS)

Schweizer S

Introduction to Soil Science: Field course (Übung, 3,5 SWS)

Wiesmeier M [L], Wiesmeier M, Garcia Franco N, Völkel J, Putzhammer S, Schad P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2734: Soil Protection | Soil Protection

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In an oral exam of 30 minutes duration, students demonstrate in a scientific discussion by answering questions without helping material their broad and deep understanding on how to protect soils. The understanding of soils, as achieved in the modules "Introduction to soil science" and "World soil resources", is implicitly part of the oral exam.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

The successful completion of the module "Introduction to Soil Science" or equivalent skills are required. The successful completion of the module "World Soil Resources" is recommended.

#### Content:

Principles of soil degradation, the world food problem, highly erodible soils, semi-arid environments (including irrigation and salinization problems), kaolinitic soils, shifting cultivation, organic and mineral fertilization, agroforestry, land use and greenhouse gases, soil functions, organic pollutants, inorganic pollutants (heavy metals), radionuclides, pesticides, pathways of pollutants, sorption, precipitation, co-precipitation, acidification, ways to assess the mobility of pollutants, remediation of brownfields.

#### Intended Learning Outcomes:

The students are able to apply their knowledge of soils, as achieved in the modules "Introduction to Soil Science" and "World Soil Resources", to develop strategies of soil protection. They understand the major environmental factors that determine the food production in the world. They are able to address the specific problems of highly erodible soils, semi-arid land and kaolinitic soils and to design adequate land-use methods. The students understand the major factors that determine the fate of substances in soil. They are able to analyze and forecast the fate of heavy metals, organic

pollutants and radionuclides in soil and are familiar with important techniques for managing and remediating brownfields.

**Teaching and Learning Methods:**

Lecture, discussions

**Media:**

Presentation notes.

**Reading List:**

Blanco, H., Lal, R. (2008): Principles of soil conservation and management. Diamond, J. (1998): Guns, germs and steel. A short history of everybody for the last 13,000 years. Mirsal, I. (2008): Soil Pollution.

**Responsible for Module:**

Schad, Peter; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Bodenschutz - Organische und anorganische Schadstoffe in Böden (Vorlesung, 2 SWS)  
Bucka F

Soil Protection and World Food Production (Vorlesung, 2 SWS)

Schad P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2735: World Soil Resources | World Soil Resources

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In an oral exam of 30 minutes duration, students demonstrate in a scientific discussion by answering questions without helping material their fundamental understanding of the soils of the world in relation to other ecological factors, and they remember the soils of the field course as well as the methods of surveying and classifying soils in the field. In a pass/fail exam (laboratory assignment) in the field of 10 minutes duration, they prove their ability to survey and classify soils of various landscapes and environmental settings. The understanding of soils, as achieved in the module "Introduction to soil science" is implicitly part of the oral exam.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

The successful participation at the module "Introduction to Soil Science" (which is given in the first half of the summer semester) is required.

#### Content:

- Soils of the world
- Chemical, biological and physical properties of soils
- Genesis of soils as the result of -soil-forming processes
- Soil survey
- Soil classification according to the international system
- Soil interpretation.

#### Intended Learning Outcomes:

The students are able to apply their knowledge of soils, as achieved in the module "Introduction to Soil Science", to all soils of the world. The students understand the characteristics of the soils of the world, the pattern of their geographical distribution, their genesis, their ecological potential and

the threats to their functions. The students are able to survey a soil profile, to detect the genesis of the surveyed soil and to classify it according to the international soil classification system. They are able to evaluate the possibilities and risks of soil management. They can assess the relationship between the soil and its environmental setting.

**Teaching and Learning Methods:**

The lecture gives an overview of all soils of the world. The field course (several days) presents soils in a landscape outside southern Bavaria. The students are trained in the methodological skills of soil survey, soil classification and soil interpretation.

**Media:**

Lecture: presentation notes. Field Assessment: spade, auger, knife, colour charts.

**Reading List:**

FAO Guidelines for Soil Description. Prepared by Jahn, Blume, Asio, Spaargaren, Schad, 2006.  
IUSS Working Group WRB: World Reference Base for Soil Resources 2014. Update 2015.  
Prepared by Schad, van Huyssteen, Micheli. FAO World Soil Resources Reports 106.

**Responsible for Module:**

Schad, Peter; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Bodenansprache und Bodenklassifikation nach internationalen Standards (Übung, 2,8 SWS)  
Schad P

World Soil Resources: Lecture (Vorlesung, 2 SWS)

Schad P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2736: Analytical Characterization of Soil Resources | Analytical Characterization of Soil Resources

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The students hand in a research paper (10-15 pages), in which they present and discuss the analytical data obtained by own laboratory characterization of soil samples that were collected by the students themselves during a guided exercise in the field. The research paper is accompanied by an oral presentation (15-20 min) to assess the scientific communication skills of the students. For the final mark, the research paper accounts for 75% and the oral presentation for 25%.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

The successful completion of the module "Introduction to Soil Science" (WZ2733) or equivalent skills are required.

#### Content:

- Sampling and sample preparation
- Lab analyses: texture, density, water conductivity, organic and inorganic carbon, nitrogen, soil organic matter decomposition, pH, cation exchange capacity, Fe oxides, phosphate retention;
- Data interpretation

#### Intended Learning Outcomes:

The students are able to apply their knowledge of soils, as achieved in the module "Introduction to Soil Science", to the most important physical, chemical and biological processes in soils. They are able to choose the adequate

laboratory method to answer a certain question on soil management. They know how to do sampling, sample preparation and laboratory work. They can interpret laboratory data and know, which conclusions can be made and which conclusions cannot be made. The students are able to communicate their results in a written and an oral manner.

**Teaching and Learning Methods:**

For every step, the lecturers give the theoretical background. Afterwards, every step is done by the students themselves, guided by the lecturers and the laboratory staff: sampling, analyses, data interpretation.

**Media:**

Lecture: presentation notes; sampling: field equipment; laboratory course: laboratory instruments

**Reading List:**

will be given in the course

**Responsible for Module:**

Schweizer, Steffen; Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Analytical characterization of soil resources: Laboratory course (Übung, 3 SWS)

Prietzl J, Schweizer S, Bucka F, Göttlein A, Kolb E, Laniewski R, Leemhuis S, Höschen C

Analytical characterization of soil resources: Lecture (Vorlesung, 1 SWS)

Schweizer S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Material and Waste Management | Material and Waste Management

### Module Description

#### WZ2724: Emission Control in Land-Use and Animal Husbandry | Emission Control in Land-Use and Animal Husbandry

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The oral examination will be held either as an individual or a group examination. If more than 40 students sign in for the examination the oral examination can be done in a written form (Klausur, 90 min). The duration of the oral examination is 20 min per person. The Students are able to describe typical agricultural production, the environmental impact and the measurement procedures to quantify and to qualify these impacts. On that basis they are able to weigh the advantages and disadvantages of possible measures of air pollution in agriculture.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Interest in the field of agriculture; willingness to learn about the causal relation between agriculture and emission control.

#### Content:

Upon completion of the module, students are able to understand and analyze:

- the principle of agriculture in plant and livestock production on a basic level
- the main emissions caused by agricultural processes on a deeper level
- interactions of agricultural processes with the emission
- the environmental effects of these emission
- the measurement procedures to qualify and quantify agricultural emissions
- possibilities of emission abatement in land-use and animal husbandry.

**Intended Learning Outcomes:**

At the end of the module students are able to:

- understand the interrelation between local causes and global impacts,
- apply the comprehension of basic physical, chemical, and biological principles to phenomena in practice,
- evaluate measurement techniques in a qualitative manner,
- evaluate measures and techniques of environment protection;
- understand the interrelation between animal husbandry and air pollution control,
- derive adequate measures of environmental protection.

**Teaching and Learning Methods:**

Lecture, practice course.

**Media:**

PowerPoint-slides, short clips.

**Reading List:**

Tba

**Responsible for Module:**

Dr. Stefan Nesper – Bavarian State Research Center for Agriculture; Institute for Agricultural Engineering and Animal Husbandry; Voettinger Strasse 36, 85354 Freising, 0049 8161 713566; stefan.nesper@lfl.bayern.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Emission control in Land-Use and Animal Husbandry (Vorlesung, 3 SWS)

Nesper S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4206: Material Flow Management and Applications | Material Flow Management and Applications

Version of module description: Gültig ab winterterm 2018/19

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a research paper of around 12-15 pages which is the means to evaluate whether the students have understood and whether they are able to apply the methodology of material flow management on a case study in a scientifically manner and to create an own scientific paper about concepts for material flow management and treatment of materials based on the methodologies of material flow analysis and life cycle assessment. management and treatment of materials based on the methodologies of material flow analysis and life cycle assessment.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

knowledge in natural science (biology, chemistry, ecology, physics);  
understanding for engineering science and also for social/cultural aspects.

#### Content:

The students acquire detailed and differentiated knowledge about the following topics:

- need of material flow management
- procedure of material flow management
- material and substance flow analysis
- material flow assessment by sustainability indicators
- life cycle assessment
- development of strategies and measures for material flow management  
(e.g. resource efficiency, urban mining, industrial ecology, bio-economy, circular economy).

### **Intended Learning Outcomes:**

By the means of the module the students are able to:

- understand the necessity of material flow management
- understand the relationships between different processes, technological treatments of materials and organizational measures
- apply the procedure of material and substance flow analysis
- apply the assessment methods of indicator systems and life cycle assessment
- create concepts for material flow management and treatment of materials.

### **Teaching and Learning Methods:**

Concerning teaching methods, lecture and presentation parts provide the theoretical foundation of materials flow management. Real case studies are introduced to the students and worked out in the class. Likewise within interdisciplinary projects in reality, the students have to define and to solve problems collaboratively in group work by studying specialist literature and data sources. At the end they have to create a research paper as homework about this topic. The students are supervised by tutorials by the lecturer.

### **Media:**

Power point presentation, lecture sheets, case studies of material and substance flow analysis and life cycle assessment.

### **Reading List:**

Brunner, P.H., Rechberger H. (2004): Practical Handbook in Material Flow Analysis. Advanced Methods in Resource and Waste Management. Lewis Publishers, Boca Raton, pp. 318.  
Brunner, P.H.; Rechberger, H.; 2016: Handbook of Material Flow Analysis: For Environmental, Resource, and Waste Engineers. Taylor & Francis Inc; 2. Revised Edition, pp. 453  
Weber-Blaschke, G.; 2009: Stoffstrommanagement als Instrument nachhaltiger Bewirtschaftung natürlicher und technischer Systeme. Ein kritischer Vergleich ausgewählter Beispiele. Schriftenreihe „Nachwachsende Rohstoffe in Forschung und Praxis“ des Wissenschaftszentrums Straubing, Bd. 1, Verlag Attenkofer, Straubing, 330 S.

### **Responsible for Module:**

Prof. Dr. Gabriele Weber-Blaschke - Lehrstuhl für Holzwissenschaft Hans-Carl-von-Carlowitz-Platz 2, 85354 Freising; 08161/71- 5635; weber-blaschke@hfm.tum.de

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Material Flow Management and Application (Vorlesung, 3 SWS)

Weber-Blaschke G [L], Weber-Blaschke G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### ED160017: Sustainable Manufacturing | Nachhaltige Produktion [SuM]

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module examination is held as a written exam (90 min) in order to be able to check the learning outcomes achieved by means of short and comprehension questions as well as complex application examples and calculation tasks. A non-programmable calculator can be used as an aid. The students calculate, among other things, various technically and economically relevant sustainability variables and parameters on the basis of given practical examples.

Thus the learning outcomes examined include basic aspects on awareness of the need for sustainable production, sustainability in the context of production, the holistic view of sustainability, manufacturing engineering measures, as well as assessment and measurement and standardisation of sustainability in production. In addition, the topics of sustainable design and use of products, energy and resource efficiency in production, social sustainability in production, data-based sustainability assessment in production and industrial circular economy are examined.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Knowledge of the basics of production and related areas (logistics, product development, etc.) is recommended but not mandatory.

#### Content:

The module covers all relevant aspects regarding the topic “sustainable manufacturing” including a general overview, ways of assessing sustainability and methods to improve sustainability in an industrial context.

Lecture units:

- Sense of urgency: Why do we need to act now?
- Sustainability in the context of manufacturing
- Thinking sustainability holistically

- Manufacturing technology measures
- Evaluate, measure and standardize sustainability in manufacturing
- Sustainable design and use of products
- Energy and resource efficiency in production
- Social sustainability in production
- Data-based sustainability assessment for manufacturing
- Industrial circular economy

The module also includes exercise units, e.g. how to conduct an LCA, how to follow ISO 14001 for sustainability assessments, practical exercise on system thinking, group activity (develop suggestions for improvement of sustainability for an exemplary company).

### **Intended Learning Outcomes:**

After attending the module, students can understand the importance of addressing the topic of sustainability, understand the fundamentals of sustainable manufacturing, evaluate the possible technical lever in a production that can be addressed to increase sustainability, analyze products regarding the potentials for being produced more sustainably, apply the concept of system thinking on sustainable manufacturing, and apply methods to measure sustainability.

### **Teaching and Learning Methods:**

The module takes place in the form of a lecture and an exercise. In the lecture, the basics of sustainable production are explained using PowerPoint presentations. The basics of sustainable production are deepened by means of use cases, expert presentations and practical application examples. In this way, participants learn, for example, how to carry out a life cycle assessment, how to follow the standards of ISO 14001 for sustainability assessments, or how to use systems thinking to find solutions. The lecture is rounded off by guest lectures from industry in order to give students an insight into current industrial issues relating to sustainability in production.

In the exercise, the methods and concepts learned in the lecture are applied to concrete examples. The participants can create solution concepts directly with the exercise instructor and thus apply what they have learned directly to industrial or academic practical examples. They thus learn, for example, how energy and resource efficiency in production can be increased, how social sustainability in production can be integrated into production management, or which measures need to be taken for data-based sustainability assessment in production.

### **Media:**

Presentations, Videos, Additional Literature

### **Reading List:**

- Neugebauer (2014): Handbuch Ressourcenorientierte Produktion. Hanser. ISBN: 978-3-446-43008-2
- Garbie (2016): Sustainability in Manufacturing Enterprises. Springer. ISBN: 978-3-319-29304-2
- Stark et al. (2017): Sustainable Manufacturing. Challenges, Solutions and Implementation Perspectives. Springer. ISBN: 978-3-319-48513-3
- Meadows (2008): Thinking in Systems. Chelsea Green. ISBN: 978-1603580557

- DIN EN ISO 14040: Umweltmanagement – Ökobilanz – Grundsätze und Rahmenbedingungen
- DIN EN ISO 14001: Umweltmanagementsysteme – Anforderungen mit Anleitung zur Anwendung

**Responsible for Module:**

Zäh, Michael; Prof. Dr.-Ing.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Sustainable Manufacturing - Exercise (Übung, 1 SWS)

Zäh M, Paul M, Schneider D, Sippl F, Wörle M

Sustainable Manufacturing (Vorlesung, 2 SWS)

Zäh M, Paul M, Schneider D, Sippl F, Wörle M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2723: Utilization and Treatment of Special Materials and Waste | Utilization and Treatment of Special Materials and Waste

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning outcome will be assessed by presentation (40 minutes per working group; about 10 minutes per person). The presentation will be complemented by a brief written precis. This assessment method is a good means to evaluate both whether the students are able to work self-reliantly on a topic and to present their significant results to an auditorium and whether they have understood their respective selected topic.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in natural science (biology, chemistry, ecology, physics) and engineering.

#### Content:

The students acquire detailed and differentiated knowledge about the following topics:

- Selected materials, products and production processes concerning high waste generation and heavy environmental problems
- Origin and types of the specific wastes,
- Classical disposal,
- Waste as a source of raw material,
- Utilization for products,
- Energetic utilization,
- Legal specification.

The special topics addressed depend on relevance, e.g. food and food waste, sewage sludge, e-waste or the like.



### **Intended Learning Outcomes:**

By the means of the module the students are able:

- to describe the differences of special waste, e.g. food waste and selected municipal or industrial waste,
- to classify the amount and quality of special waste streams,
- to analyze problems concerning the special wastes,
- to develop treatment measures to handle the waste for avoiding or reducing impacts on the environment and human health,
- to transmit developed solutions to other waste and new products.

### **Teaching and Learning Methods:**

The module consists of a lecture, providing the theoretical foundations, in combination with a seminar including feedback by the lecturers to the students' work. The students have to define and to solve problems collaboratively in group work by studying specialist literature. At the end they have to prepare a presentation and a brief summary including problem statement and conclusions as homework under time constraint about this topic. The students are supervised by the lecturers.

### **Media:**

PowerPoint Presentation

### **Reading List:**

Oreopoulou V.; Russ W. (2007): Utilization of By-Products and Treatment of Waste in the Food Industry, Springer; New York.

Additional literature depending on themes.

### **Responsible for Module:**

Weber-Blaschke, Gabriele; Apl. Prof. Dr. rer. silv.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Utilization and Treatment of Special Materials and Waste (Seminar, 2 SWS)

Weber-Blaschke G [L], Reh K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### BGU38014: Water and Wastewater Treatment Engineering | Wasserversorgung, Wasseraufbereitung und Abwasserbehandlung

Version of module description: Gültig ab summerterm 2020

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination of the module is a written exam of 120 minutes duration.

Through theoretical questions students prove that they understand the individual stages for the elimination of wastewater constituents, the basics of water supply and wastewater management systems as well as necessity and feasibility of wastewater treatment methods, especially of municipal wastewater. Through calculation and design tasks, which are comprised of a treatment task with given input parameters, the students show that they can analyze resource management in the field of wastewater treatment, the performance of related systems, as well as location factors for water technology systems and can critically evaluate various conventional water and wastewater treatment techniques, taking into account urban and natural conditions. They also show that they are able to analyze water treatment problems in a limited time and apply the necessary procedures for the protection of public health, as well as to develop process optimization and solutions for municipal wastewater treatment considering technical and legal regulations.

The tasks often require own formulations, in some cases, multiple choice answers, the focus however being on short calculation tasks. In the exam, limited aids such as lecture handouts and personal notes are allowed. Not allowed are text books, internet and communication among themselves and with third parties.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Siedlungswasserwirtschaft Grundmodul (BGU38016)

Siedlungswasserwirtschaft Projektkurs (BGU38020)

**Content:**

1. Water supply resources and source protection; Character of raw water qualities
2. Regulatory and technical requirements for water and wastewater treatment; discharge standards
3. Processes to abstract, treat, store and distribute water for potable supply
4. Structure and organization of public water supply
5. Operation and maintenance of water treatment facilities
6. Character of wastewater, in particular municipal wastewater
7. Regulatory requirements and discharge standards
8. Approaches to treat municipal wastewater/resource recovery facilities
9. Fundamentals of biotechnology and microbial reactions/processes
10. Biological treatment processes
  - a. Activated sludge processes (aerobic, anaerobic)
  - b. Sequencing Batch Reactor (SBR) Technology
  - c. Biofilm reactors
11. Disinfection (chlorine-based; UV irradiation)
12. Biosolids stabilization and energy recovery from waste streams

**Intended Learning Outcomes:**

After completion of this module course the students are able to:

- understand concepts of drinking water and wastewater treatment facilities and processes
- they will be able to apply the knowledge to select proper siting for drinking water facilities considering constraints within the urban and natural environment
- to analyze critical control points and evaluate the appropriate treatment unit processes to protect public health
- to create optimized treatment processes based on regulatory and technical requirements
- to understand the need and feasibility of wastewater treatment, with special emphasis on treatment of municipal wastewater
- to apply individual unit processes and operations to remove problematic constituents from wastewater using biological processes for organic and inorganic constituents as well as pathogens
- to analyze resource management related to wastewater treatment
- to design concepts for conventional processes for wastewater treatment and evaluate their performance.

**Teaching and Learning Methods:**

The module consists of a lecture with integrated exercises. In the lecture, the technical and legal requirements for water and wastewater treatment as well as the theoretical principles of mechanical and biological treatment methods are presented by means of presentations. Furthermore, holistic concepts for water and wastewater treatment are presented. On the basis of the lecture, the methods for water and wastewater treatment are worked into voluntary problem-solving exercises during class exercises and via the Moodle platform.

**Media:**

Powerpoint presentations; Exercises in class and as voluntary homework via classworks during the lecture and via Moodle

**Reading List:**

Crittenden et al. (2012), Water Treatment Principles and Design , 3rd edition, John Wiley & Sons, New York, 2012

Edzwald, J. (2011), Water Quality & Treatment , 6th edition, McGraw Hill, New York, 2011

McGraw-Hill; 4th edition (2003). Wastewater Engineering Treatment and Reuse

Fourth Edition by Metcalf & Eddy, Inc.

Gujer, Willi (2007). Siedlungswasserwirtschaft. Springer, 3., bearb. Aufl.

**Responsible for Module:**

Prof. Dr.-Ing. Jörg Drewes (jdrewes@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Water and Wastewater Treatment Engineering (Vorlesung mit integrierten Übungen, 4 SWS)

Drewes J [L], Drewes J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4207: Waste and Waste Water Treatment | Waste and Waste Water Treatment

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The written exam (90 min.) consists of general questions and simple calculations. In the written exam students demonstrate their theoretical knowledge of waste and wastewater treatment. The answers require wording but also single choice tests as well as calculations. Only the use of a calculator is allowed (closed book exam).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Interest and basic knowledge in chemistry, physics, biology and preferably in environmental, chemical, civil or process engineering. However, the level of the course is adapted to the known broad spectrum of background knowledge allowing also students to follow you hold a bachelor in a totally different realm.

#### Content:

Waste management:

1. Basics of waste management (What is waste, waste amounts, history and future of waste, waste legislation);
2. Avoidance and recovery of waste and waste management concepts;
3. Waste disposal (legal aspects of landfill, processes in above-ground landfill, above-ground landfill technologies, underground disposal sites);
4. Biological treatment (legal aspects, composting, fermentation, mechanical biological treatment, sewage sludge, substitute fuels);

5. Thermal treatment (legal aspect, thermal processes, equipment, power generation, alternative thermal processes, hazardous waste treatment).

Wastewater treatment:

1. Water treatment & management concepts; overview wastewater treatment steps
2. Wastewater characteristics & discharge limits
3. Mechanical wastewater treatment
4. Fundamentals in bioprocess technology; stoichiometry of biological reactions; kinetics of biological reactions; aeration
5. Biological wastewater treatment
6. Sewage sludge treatment
7. Field trip Garching wastewater treatment plant (optional)

**Intended Learning Outcomes:**

At the end of the module, students are able to:

1. Understand the necessity and objectives of waste management.
2. Understand the most important processes and technologies for waste treatment.
3. Decide which treatment method is valid for which type of waste.
4. Understand sources and types of emissions arising from waste treatment and measures for emission reduction
  
8. Understand the necessity and the feasibility of wastewater treatment especially in treating municipal wastewater.
9. Classify the single steps of eliminating wastewater compounds, such as coarse material, organic and inorganic pollutants.
10. Recall important treatment processes and their requirements.
11. Assess pros and cons of different treatment technologies.

**Teaching and Learning Methods:**

The knowledge in the field of waste management is imparted during lectures. Theoretical background is given and discussed at practical examples of existing waste management infrastructure (Collection Systems, Landfills, Treatment Facilities, etc.)

The content of the lecture are taught through practical examples. By means of example tasks in the lecture, possible solutions are discussed and exemplified calculations are performed. An optional field trip to the Garching wastewater treatment plant at the end of the course allows connecting theoretical knowledge with practical application and gives a final platform for questions.

**Media:**

The course is mainly taught by PowerPoint presentation and supported by notices on the black board. The lecture notes are uploaded to Moodle. It is ensured that further readings are available in the university library either for download or as hardcopy in an adequate number.

**Reading List:**

Waste Management:

Bilitewski, B., Härdtle, G., Marek, K.; Weissbach, A.; Boedekker, A.: Waste Management, Springer-Verlag Berlin Heidelberg, ISBN-10: 9783642082122

Waste Management: [https://issuu.com/tkverlag/docs/waste\\_management\\_4](https://issuu.com/tkverlag/docs/waste_management_4)

Evans, G. (Ed): Biowaste and Biological Waste Treatment, ISBN: 978-1-902916-08-8

Wastewater Treatment:

la Cour Jansen, J., Arvin, E., Henze, M., Harremoes, P., 2019. Wastewater treatment - Biological and chemical Processes. Polyteknisk Boghandel og Forlag, Lyngby.

Tchobanoglous, G., Burton, F.L., Tsuchihashi, R., Stensel, H.D., 2013. Wastewater Engineering: Treatment and Resource Recovery. McGraw-Hill, Boston.

Wiechmann, B., Dienemann, C., Kabbe, C., Brandt, S., Vogel, I., Roskosch, A., 2013. Sewage sludge management in Germany. Umweltbundesamt, Bonn.

**Responsible for Module:**

Konrad Koch

**Courses (Type of course, Weekly hours per semester), Instructor:**

Waste Management (Vorlesung, 2 SWS)

Franke M

Waste Water Treatment (Vorlesung, 2 SWS)

Koch K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Sustainable Agricultural Value Chains | Sustainable Agricultural Value Chains

### Module Description

#### WZ1876: Entrepreneurship in the Agricultural and Horticultural Industry | Entrepreneurship in the Agricultural and Horticultural Industry

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module examination consists of a 120-minute written exam. This will focus on testing the holistic understanding and competence with regard to the conceptual and methodological approaches in agri-food entrepreneurship.

In addition, students will analyze business start-up processes and risks in the innovation and product development process, assess entrepreneurial cooperations in the agricultural and horticultural sector, and design associated management and organizational structures.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Fundamentals of Microeconomics, Market analysis

#### Content:

The module covers and discusses the principles, theoretical approaches and significance of entrepreneurship orientations to support the application of innovations and start-up related economic activities in the agricultural and horticultural value chains and industries. The course specifically includes the following topics:

- Principles of entrepreneurship and entrepreneurship orientations in the agricultural and horticultural industries.
- Innovation and product development processes and related entrepreneurial opportunities and risks



- Entrepreneurial strategies and collaborations in the venture creation process
- Methodological approaches (e.g. attribute mapping, strategy canvas and various business model and quantitative approaches) to explain and evaluate entrepreneurship-related activities and venture creation processes
- Sustainable entrepreneurship

### **Intended Learning Outcomes:**

After successful completion of the module, students will be able to:

- understand the principles of entrepreneurship and business creation in the agricultural and horticultural sector,
- use qualitative and quantitative methods to explain and evaluate entrepreneurship related activities,
- analyze the risks and opportunities in innovation and product development,
- assess collaborations and strategies in entrepreneurship and business creation, and
- develop venture creation processes, associated management, and organizational structures.

### **Teaching and Learning Methods:**

With the help of lectures, the theoretical approaches and concepts of entrepreneurship and the business start-up process are taught. Group work and presentations are used to describe and work on practical problems and proposed solutions.

### **Media:**

Presentations, case descriptions, scripts

### **Reading List:**

- Ardichvili, A., Cardozo, R., & Ray, S. (2003). A theory of entrepreneurial opportunity identification and development. *Journal of Business Venturing*, 18: 105–123.
- Berti, G. and Mulligan, C. (2016). Competitiveness of Small Farms and Innovative Food Supply Chains: The Role of Food Hubs in Creating Sustainable Regional and Local Food Systems. *Sustainability*, 8 (616): 1-31.
- Bolton, W.K. and Thompson, J.L. (2000). *Entrepreneurs: Talent, Temperament, Technique*. Butterworth Heinemann, Oxford.
- Casson, M., (2003). *The Entrepreneur*, New York, NY: Edward Elgar Publishing.
- Dunkelberg, et al. (2013). Do entrepreneurial goals matter? Resource allocation in new owner-managed firms. *Journal of Business Venturing*, 28: 225–240.
- Grichnik, D. (2006). *International Entrepreneurship: Entscheidungs- und Risikoverhalten von Unternehmensgründern und Venture-Finanziers in kulturellen Kontexten — Theoriebildung und empirische Analysen*. Berlin: Duncker & Humblot-Verlag.
- Howieson, et al. (2014). New Product Development in Small Food Enterprises. *Journal of New Business Ideas & Trends*, 12(1): 11 - 26.
- Joakim, T. et al. (2016). Business model innovation in the agri-food sector: a literature review. *British Food Journal*, 118(6): 1462-1476.

Kim, W.C. and Mauborgne, R. (2005). *Blue Ocean Strategy*, Harvard Business School Press: Boston.

Shane, S. and Venkataraman, S. (2000). The Promise of Entrepreneurship as a Field of Research, *Academy of Management Review*, 25(1): 218–228.

McGrath, R. G. and MacMillan, I. (2000). *The Entrepreneurial Mindset: Strategies for Continuously Creating Opportunity in an Age of Uncertainty*.

Mirzaeia, O. et al. (2016). Product and Marketing Innovation in Farm-Based Businesses: The Role of Entrepreneurial Orientation and Market Orientation. *International Food and Agribusiness Management Review*, 19(2): 99-130.

Morris, et al. (2017): Farm diversification, entrepreneurship and technology adoption: Analysis of upland farmers in Wales. *Journal of Rural Studies* 53: 132-143.

Shadbolt, M.N. and Olubode-Awosola, F. (2016). Resilience, Risk and Entrepreneurship. *International Food and Agribusiness Management Review*, 19(2): 33-52 .

Sporleder, et al. (2008). Innovation in Food Products: First-mover Strategy and Entropy Metrics. *International Food and Agribusiness Management Review*, 11(3): 139-164.

York, G.J. and Venkataraman, S. (2010). The entrepreneur–environment nexus: Uncertainty, innovation, and allocation. *Journal of Business Venturing*, 25: 449–463.

Die Liste wird anhand von weiteren thematisch relevanten Büchern, Zeitschriftenartikeln und aktuellen Themen aktualisiert

#### **Responsible for Module:**

#### **Courses (Type of course, Weekly hours per semester), Instructor:**

Entrepreneurship in the Agricultural and Horticultural Industry (WZ1876, englisch) (Vorlesung, 4 SWS)

Abate Kassa G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1921: Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry | Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry

Version of module description: Gültig ab winterterm 2019/20

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment type for the module is a graded learning portfolio (100%). The portfolio includes memorandums addressing 9-10 of the case studies discussed in class; and a learning statement addressing conceptual, scientific and personal learning. Through the case memorandums, the students show the ability to discuss the assigned case questions by selecting and applying suitable theoretical concepts to supply chain management and sustainability challenges in the specific context of agribusiness and the food industry. In the learning statement, students demonstrate the ability to reflect on the semester long learning process and summarize the insights gained.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Solid economic and management background; knowledge of basic concepts of strategic analysis, planning, and management (e.g., industry analysis, horizontal and vertical coordination, and SWOT), as well as the ability to apply these concepts; furthermore, knowledge of value chain management is required (e.g., theoretical background, supply chain dynamics, actors and partnerships, governance). Successful completion of a management course on M.Sc. level required, e.g., agribusiness management or value chain management. Medium level experience in desk research and scientific writing is required.

#### Content:

The module builds on key concepts of supply chain management, strategy, and sustainability to provide master level students with the competency to evaluate pertinent issues in agribusiness and food industry supply chains.

Topics covered include:

- value propositions, creating and capturing added value in agribusiness and the food industry
- management of customers, suppliers, and other stakeholders
- innovation in supply chains, sustainability as an innovation, sustainable supply chains
- CSR (corporate social responsibility) and sustainability measurement
- implementation of a sustainability strategy, as well as costs and benefits of sustainable practices in agribusiness and the food industry
- ethical issues in supply chain management.

### **Intended Learning Outcomes:**

After successfully completing of the module, students are able to evaluate processes of supply chains management in agribusiness and the food industry.

Specifically, students are able to

- evaluate value propositions, as well as plans for creating and capturing value
- evaluate the management of customers, suppliers, and other stakeholders
- independently choose scientific models or concepts relevant to the analysis process of agricultural and food industry supply chains and justify their choice
- evaluate the implementation of a CSR concept or sustainability strategy, and monitor its effects on operations, suppliers, associates, and customers
- identify and analyze ethical issues in supply chain management and to recommend how to apply ethical practices.

### **Teaching and Learning Methods:**

The course Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry has a seminar format based on the case study method. The seminar format is implemented based on case descriptions of problems, challenges, and innovations in agribusiness and food industry supply chains. Through individually prepared class discussions and group work, students develop the ability to critically reflect and apply concepts of strategy, supply and value chain management, and sustainability requirements in the context of agribusiness and the food industry. During class discussions and group presentations, students reflect on their experiences, prior knowledge, and assignments to develop an in-depth understanding of current challenges in supply chains and how to address the.

### **Media:**

Reading assignments; case descriptions; presentation software; discussion facilitation support media, such as flipcharts and discussion boards; video clips and podcasts.

### **Reading List:**

Current articles from scientific journals as appropriate.

Selected chapters from

Bouchery, Corbett, Fransoo, and Tan (2017): Sustainable Supply Chains: A Research-Based Textbook on Operations and Strategy. Springer: Berlin, Heidelberg, Germany.

Pullmann and Wu (2011): Food Supply Chain Management: Economic, Social and Environmental Perspectives. Routledge, New York, US.

**Responsible for Module:**

Bitsch, Vera; Prof. Dr. Dr. h.c.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry (WZ1921) (Seminar, 4 SWS)

Bitsch V [L], Köksal S, Huhn-Kücükakyüz C, Carlson L

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1567: Sustainability: Paradigms, Indicators, and Measurement Systems | Sustainability: Paradigms, Indicators, and Measurement Systems

Version of module description: Gültig ab summerterm 2019

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment type for the module is a graded report (10 pages). The report includes three sections: (1) critical analysis of a published empirical sustainability study in the context of its sustainability definitions and authors' backgrounds; (2) critical analysis of a sustainability measurement system in use with regard to fulfilling requirements to be met by indicators and indicator systems; (3) critical analysis of a public sustainability claim by an organization from a consumer or citizen point of view. Each analysis is also presented by each student. Through reports, the students demonstrate the ability to understand relevant research, measurement systems and claims, as well as critically analyze and discuss these issues. Through the presentation and discussion of each analysis, students demonstrate their ability to communicate these critical issues and further reflect on each topic in the light of other students' questions and presentations.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge and understanding of economic and management concepts as well as of social science research methods is required.

#### Content:

The development of a differentiated understanding of sustainability requires the critical analysis and reflection of sustainability concepts on multiple levels. In the module the following levels are systematically analyzed and discussed based on guided discussions of assigned readings and materials developed by students based on literature and internet research:

- Paradigms and value judgments in research on and evaluation of sustainability;

- Economic, environmental and social aspects of sustainable production, marketing, and consumption;
  - Measurement systems for sustainability on different levels (products, supply chains etc.);
  - Public and private standards, sustainability certifications and communication;
  - Consequences of measurement systems and their foci, e.g., on environmental aspects, such as carbon footprint, or on social aspects, such as fair trade
- These topics are discussed in the context to current and controversial issues regarding sustainability in science and in society.

### **Intended Learning Outcomes:**

After successfully completing the module students are able to

- Analyze and evaluate the consequences of different paradigms on the definition and understanding of sustainability and its use in published scientific articles;
- Analyze and evaluate sustainability measurement systems on the product, enterprise, and supply chain levels as well as their potential consequences;
- Evaluate public sustainability claims based on the research of available information sources;
- Apply a differentiated understanding of sustainability in an interrelated, globalized context with differing value systems and priorities in scientific and practical questions and issues.

### **Teaching and Learning Methods:**

The course “Sustainability: Paradigms, Indicators, and Measurement Systems” has a seminar format based on assigned readings and student presentations on assigned topic areas.

After an introductory guided class discussion on assumptions and implicit sustainability definitions of participants, readings are assigned and discussed in class to lay the basis for later student presentations. Through individual document research and individually prepared class presentations, students develop the ability to critically reflect on sustainability research, sustainability indicators and measurement systems, as well as sustainability claims by various actors and organizations. Through presentations and concept discussions, students develop in-depth knowledge of sustainability issues and hone their critical thinking skills. A final discussion summarizes students’ learning and additional findings throughout the semester in the concept of wicked problems.

### **Media:**

Reading assignments; use of data bases for literature research; presentation software; discussion facilitation support media, such as flipcharts and discussion boards; video clips and podcasts.

### **Reading List:**

National Resource Council 2010, Toward Sustainable Agricultural Systems in the 21st Century, Washington/D.C.: National Academies Press.

Current articles on sustainability paradigms, requirements of sustainability indicators and indicator systems, and applications.

### **Responsible for Module:**

**Courses (Type of course, Weekly hours per semester), Instructor:**

Sustainability: Paradigms, Indicators, and Measurement Systems (WZ1567) (Seminar, 4 SWS)

Bitsch V [L], Bitsch V, Carlson L

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WI001190: Cooperation and Integration in Agribusiness | Cooperation and Integration in Agribusiness

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module assessment will be in the form of 120-minuten written exam. In the exam, students should demonstrate that they understand the theoretical concepts and apply relevant analytical methods to solve problems. In addition, the students should prove that they can analyze practical problems, assess the various forms of cooperation and networks in agribusiness, and develop appropriate solutions for strategic cooperation and integration.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Basics of sustainability and organizational collaboration

#### Content:

The module deals with the complex forms and approaches of cooperation and integration in agribusiness in order to improve the performances of agricultural enterprises. Specific topics of the module are:

- Theoretical approaches and basics of cooperation and integration with a focus on the concept of institutional economics (resource-based theory, transaction cost economics, contract theory, principal-agent approach, value chain governance and interventions including certification programs)
- Strategic options of horizontal and vertical integrations
- Forms of customer, business relationship and stakeholder management
- "Lean Management" and corporate collaborations
- Sustainability in the agri-food value chain and entrepreneurial activities

### **Intended Learning Outcomes:**

Upon completion of the module, students will be able to:

- understand collaboration dynamics, challenges and problems as well as related solutions,
- use relevant qualitative and quantitative methods to analyze and improve business collaborations within the value chain,
- analyze and evaluate agribusiness related horizontal and vertical integrations,
- develop and design strategies for effective agri-food entrepreneurial collaborations and integrations.

### **Teaching and Learning Methods:**

Lecture with integrated individual exercises, group work and case study analysis.

The lecture is used to teach the theoretical concepts and approaches. Individual assignments, group work and case studies are used to work on specific empirical problems and to find solutions. This also includes learning through literature analysis.

### **Media:**

Presentations (power points), case analysis formats and scripts

### **Reading List:**

- Adebanjo, D. 2009. Understanding demand management challenges in intermediary food trading: a case study. *Supply Chain Management: An International Journal*, 14(3): 224 – 233
- Fischer, F., et al. (2010), Factors influencing contractual choice and sustainable relationships in European agri-food supply chains. *European Review of Agricultural Economics*, 36(4): 541-569
- Gall, R. G. and Schroder, B. (2006). Agricultural Producer Cooperatives as Strategic Alliances. *International Food and Agribusiness Management Review*, 9 (4): 26-44.
- Gereffi, G., Humphrey, J. and Sturgeon, T. (2005). The Governance of Global Value Chains. *Review of International Political Economy*, 21(1): 78-104
- Mugera, A. W. (2012). Sustained Competitive Advantage in Agribusiness: Applying the Resource-Based Theory to Human Resources. *International Food and Agribusiness Management Review*, 15(4): 27-48
- Peterson, C. et al (2001). Strategic choice along the vertical coordination continuum. *International food and agri-business review*, 4:149-166
- Polonsky, M.J. et al. (2002). A Stakeholder Perspective for Analyzing Marketing Relationships. *Journal of Market-Focused Management*, 5:109–126
- Porter, M.E. (1985), *Competitive Advantage: Creating and Sustaining Superior Performance*, Free Press, New York.
- Schulze, et al. 2006. Relationship quality in agri-food chains: Supplier management in the German pork and dairy sector. *Journal on Chain and Network Science*, 6:55-68
- Soon, J.M. and Baines, R.N. (2013). Public and Private Food Safety Standards: Facilitating or Frustrating Fresh Produce Growers? *Laws* 2: 1–19
- Trienekens, J. and Zuurbier, P. (2008). Quality and safety standards in the food industry, developments and challenges. *Int. J. Production Economics*, 113: 107–122

Torres, J. et al. (2007). An Evaluation of Customer Relationship Management (CRM) Practices Among Agribusiness Firms. *International Food and Agribusiness Management Review*, 10(1): 36-56

Walters, D. and Rainbird, M. (2007). *Strategic Operations Management*. Palgrave Macmillan

Weber, A. (2011). „Why do farmers spend different amounts of transaction costs in agri-environmental schemes?“

Williamson, Oliver E. 1979. Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, 22(2): 233–61.

The list will be expanded and updated using other thematically relevant books, journal articles and periodical newsletters and others.

**Responsible for Module:**

Sauer, Johannes; Prof. Dr. agr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Cooperation and Integration in Agribusiness (WI001190) (Vorlesung, 4 SWS)

Abate Kassa G [L], Abate Kassa G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI001215: Network and stakeholder analysis: Sustainable resource use and agri-food system | Network and stakeholder analysis: Sustainable resource use and agri-food system

Version of module description: Gültig ab winterterm 2019/20

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

There will be a 120-minute written exam. A written exam is necessary in order to assess the holistic understanding and analytical competencies of the students. In the exam, students will describe, discuss and analyze the concepts, dimensions and methodological approaches related to network and stakeholders in sustainable resource management and agri-food sector.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in cooperation and sustainability

#### Content:

The module deals with the theoretical concepts, methodologies and measurement indicators and approaches of networks and stakeholders for sustainable resource management and agri-food system. Specific topics include the following:

- Network and stakeholder theories and concepts to understand, describe and explain the structure, characteristics, interactions among networks and stakeholders
- Concepts and approaches to examine network and stakeholder compositions, engagements, conflicts and influences in designing and implementing strategic decisions related to sustainable innovation, resource management and agri-food system.
- Types, levels and extents of risk associated with stakeholder engagement in implementing sustainability related projects and programs

- Specific methodological approaches, tools and indicators to evaluate and prioritize the performances, outcomes and implications of different network and stakeholder constellations.
- Other relevant current network and stakeholder issues in sustainable innovation, resource management and agri-food system.

### **Intended Learning Outcomes:**

After completing the module, students are able to

- understand the theories, concepts, principles and frameworks underlying network and stakeholder issues, influences and collaborations for sustainable innovation, resource management and agri-food system
- apply relevant techniques and tools for describing social, economic, environmental and institutional contexts of network and stakeholder management and engagement policies and strategies towards achieving specific sustainable goals.
- analyze types, levels and extent of risks associated with stakeholder engagement and commitment in implementing sustainability related projects and programs
- critically assess and evaluate the structure, characteristics, and impacts of various forms of networks and stakeholder groups on the outcomes of sustainable resource management, innovation and agri-food system.

### **Teaching and Learning Methods:**

The module includes lectures, individual and group exercises, reading assignments, and presentations. The lectures will provide theoretical and conceptual basis. Individual and team exercises will be used to analyze and discuss specific network and stakeholder issues and their solutions.

### **Media:**

Präsentationen, Fallbeschreibungen, Skripte

### **Reading List:**

Freeman, R.E (1984). Strategic Management: A stakeholder Approach. Boston.  
Prell, C., K. Hubacek and M. Reed (2009). Stakeholder analysis and social network analysis in natural resource management. *Society & Natural Resources* 22(6): 501-518.  
Chiffolleau, et al. (2014) Understanding local agri-food systems through advice network analysis. *Agric Hum Values*, 31:19–32  
Lange, P. et al. (2015). Sustainability in Land Management: An Analysis of Stakeholder Perceptions in Rural Northern Germany. *Sustainability*, (7): 683-704.  
Reed, M. S. et al. (2009). Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management* 90(5): 1933-1949.

Mcadam, et al. (2016). Regional Horizontal Networks within the SME Agri-Food Sector: An Innovation and Social Network Perspective. *Regional Studies*, 50(8): 1316–1329

Katz, N. et al. 2004. Network Theory and Small Groups. *Small Group Research*, 35(3): 307-332.

Sandström, A. and C. Rova (2010). Adaptive co-management networks: A comparative analysis of two fishery conservation areas in Sweden. *Ecology and Society* 15(3): 14.

Bixler, et al. R (2016). Network governance for large-scale natural resource conservation and the challenge of capture. *Frontiers in Ecology and the Environment* 14(3): 165-171.

Bixler, R. P. et al.(2016). Networks and landscapes: A framework for setting goals and evaluating performance at the large landscape scale. *Frontiers in Ecology and the Environment*, 14(3): 145-153.

Ernstson, et al. (2010). "Scale-crossing brokers and network governance of urban ecosystem services: The case of stockholm." *Ecology and Society*, 15(4): 28.

Muñoz-Erickson, T. A. and B. B. Cutts (2016). Structural dimensions of knowledge-action networks for sustainability. *Current Opinion in Environmental Sustainability*, 18: 56-64.

Wubben, E. and Gohar Isakhanyan. (2011). Stakeholder Analysis of Agroparks. *Int. J. Food System Dynamics* 2(2), 2011, 145#154.

The list will be expanded and updated using other thematically relevant books, journal articles and periodical newsletters and others.

**Responsible for Module:**

Abate Kassa, Getachew; Dr. rer. hort.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Network and stakeholder analysis: Sustainable resource use and agri-food system (WI001215, englisch) (Vorlesung, 4 SWS)

Abate Kassa G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Free Elective Modules | Free Elective Modules

### Module Description

#### BGU38019: Anaerobic Processes and Energy Recovery | Anaerobtechnik und Energierückgewinnung

Version of module description: Gültig ab winterterm 2018/19

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The proof of performance is made in the form of a 60-minute written exam with questions on the fundamental understanding as well as small calculation tasks.

The aim of the written exam is the proof that the basic approaches in the field of energy recovery from urban waste streams were understood and different methods can be applied comparatively. Problems need to be analyzed and based on learning outcomes acquired in the course, students have to find and implement solutions in limited time. In the theoretical part, comprehension questions must be answered to basics of anaerobic technology and energy recovery from waste streams. In the calculating part, diverse issues should be analyzed and calculated based on the learning outcomes acquired during the module.

The answers require partly own formulations, partly ticking given single or multiple answers. The focus is on short calculation tasks. For the exam no aids are permitted except for a non-programmable calculator.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Water and Wastewater Treatment Engineering (BGU38014)

#### Content:

- Basics of anaerobic digestion
- Co-digestion
- Power to gas
- Treatment of sewage sludge

- o Agricultural use and incineration
- o Recovery of phosphorous

**Intended Learning Outcomes:**

After the successful participation in the course, the students will be able to:

- remember the basic process concepts,
- analyze and evaluate the advantages and disadvantages of the different methods for the specific application,
- and develop simple approaches to calculate and dimension treatment schemes.

**Teaching and Learning Methods:**

The contents of the lecture are taught through practical examples. By means of example tasks in the lecture, possible solutions are discussed and exemplified calculations are performed. During exercise included in the lecture, students apply what they have learned on similar tasks and internalize the approach. The self-study is supported by the provision of further literature in Moodle.

**Media:**

Beamer, black board, literature provided

**Reading List:**

Appels, L., Baeyens, J., Degève, J., Dewil, R., 2008. Principles and potential of the anaerobic digestion of waste-activated sludge. *Prog. Energy Combust. Sci.* 34, 755–781.

Chen, Y., Cheng, J.J., Creamer, K.S., 2008. Inhibition of anaerobic digestion process: A review. *Bioresour. Technol.* 99, 4044–4064.

Kelessidis, A., Stasinakis, A.S., 2012. Comparative study of the methods used for treatment and final disposal of sewage sludge in European countries. *Waste Manag.* 32, 1186–1195.

Roskosch, A., Otto, S., 2014. Technical Guide on the Treatment and Recycling Techniques for Sludge from Municipal Wastewater Treatment with references to Best Available Techniques (BAT). Fed. Environ. Agency Ger.

Wiechmann, B., Dienemann, C., Kabbe, C., Brandt, S., Vogel, I., Roskosch, A., 2013. Sewage sludge management in Germany. Umweltbundesamt, Bonn.

**Responsible for Module:**

Dr.-Ing. Konrad Koch, k.koch@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Anaerobtechnik und Energierückgewinnung (Vorlesung, 2 SWS)

Koch K [L], Koch K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### CS0126: Advanced Seminar in Circular Economy and Sustainability Management | Advanced Seminar in Circular Economy and Sustainability Management [ASCESM]

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 7	<b>Total Hours:</b> 210	<b>Self-study Hours:</b> 150	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

"Term paper and presentation: Students have to write a scientific paper on the given topic (15-20 pages). In doing so they have to show that they are capable to find relevant literature, structure a problem, solve it, and document the results of the process in a scientific paper. In the 30 minute final presentation they have to show that they are able to summarize their findings in a scientific presentation, discuss and defend them (20' for presentation, 10' for discussion).

Weighting: Term paper 2, Presentation 1"

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

-

#### Content:

"The module deals with actual topics from Circular Economy and Sustainability Management. These differ from semester to semester. Topics will be announced at the end of the preceding semester.

#### Intended Learning Outcomes:

The seminar aims at enabling students for scientific work. After passing the module the students are able to find, structure and analyse relevant literature, solve the problem scientifically, discuss the solution critically, summarize the work in a term paper, hold a scientific presentation, and discuss and defend their work. Thereby the students acquire in-depth knowledge on a current topic from the thematic field of circular economy and sustainability management.

### **Teaching and Learning Methods:**

Seminar: after an introduction on the topic the students carry out a literature research, structure the problem, identify solution approaches, apply these. They summarize their findings in a term paper and a scientific presentation. In this process they are supervised, receive materials, thematic introductions, advise in scientific work and continuous feedback in the seminar sessions. The seminar closes with a final presentation.

Teaching / learning methods:

- Kick-off session: media-assisted presentation
- Individual work and feedback
- Interim presentations / workshops
- Final presentation
- Computer lab exercises using LCA software systems and Life Cycle Inventory Data bases.

### **Media:**

Digital projector, board, flipchart, online contents, recent scientific journal publications, computer lab

### **Reading List:**

Recommended reading:

- Gastel B; Day R A (2017): How to write and publish a scientific paper, Cambridge University Press
- Glasman-Deal H (2009): Science Research Writing For Non-Native Speakers Of English: A Guide for Non-Native Speakers of English, Imperial College Press
- Skern T (2011): Writing Scientific English: A Workbook, UTB

Topic related reading, especially articles in international peer reviewed journals, will be provided in the kick-off meeting of the module.

### **Responsible for Module:**

Magnus Fröhling

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Advanced Seminar Circular Economy and Sustainability Management: Circular Carbon Technologies (Seminar, 4 SWS)

Fröhling M [L], Fröhling M, Voss R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ0246: Advanced Concepts and Methods in Urban Ecosystems | Advanced Concepts and Methods in Urban Ecosystems

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 75	<b>Contact Hours:</b> 75

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module assessment is based on participation in group discussions, written critical reflections, and practical work assignments that demonstrate conceptual and applied understanding of course goals.

In addition, there is the possibility to submit a voluntary Mid-Term-Assessment (after APSO §6, Abs.5). For this assessment, students submit exercises, consisting of 3 assignments that were completed through the weekly exercises (e.g. data collection or analysis activity). Students should submit this on Moodle. By passing this coursework students can improve their module grade up to 0,3. For the Mid-Term-Assessment, no repetition date is offered. In case of a repetition of the module examination, a previously completed Mid-Term-Assessment will be taken into account.

The examination performance is given in the form of a research paper. The research paper will include a written research proposal (3-5 pages; 80% of grade) complemented by an oral presentation (15 min. + 5 min. discussion; 20% of grade). In the research proposal, each student will develop a research question, hypothesis(es), and experimental protocol to answer their question. Students should situate their research proposal in a theoretical framework, and propose fitting methods to examine their research question. Students will search for and synthesize relevant literature to justify their experimental choices. The final written research proposal will be the culmination of this project and will take the form of a research grant proposal. Students will comply with the same proposal guidelines and rules that graduate (PhD) students must follow when they apply for funding from e.g., Deutsche Bundesstiftung Umwelt ([https://www.dbu.de/stipendien\\_promotion](https://www.dbu.de/stipendien_promotion)). Written summaries measure each student's understanding and evaluation of environmental/ecological and social concepts, and ability to apply theoretical frameworks and appropriate methods. In the presentation, the students present their research proposal (PowerPoint plus any additional aides) to demonstrate understanding of a research gap in

urban ecosystems, communicative competence, presentation and discussion skills in front of an audience.

**Repeat Examination:**

Next semester / End of Semester

**(Recommended) Prerequisites:**

Basic knowledge in ecology and landscape ecology; beneficial to have completed the module(s) "Urban Ecology" WZ6407.

**Content:**

Urban areas are major drivers of global environmental change, habitat degradation, changes in biodiversity, and the loss of vegetation biomass. These and many other factors emphasize the necessity to understand and examine how urbanization affects the interactions between humans, greenspaces, wildlife and the built environment. Furthermore, it opens questions around the possibilities for urban habitats and landscapes to support the enhancement of biodiversity, energy conservation, food security, public health and well-being.

This module explores the ecology and planning of urban areas and landscapes. We will discuss advanced concepts in urban ecology including: altered dispersal and colonization dynamics of urban plant and animal communities; effects of environmental stressors on plant and animal traits and their interactions; soil and substrate heterogeneity in community dynamics, ecosystem structure and function; water and energy flows in urban food production; changes in cultural ecosystem services and human values; and the spatial analysis of dynamic urban land use. The students will utilize methodological approaches in urban ecology research including collecting and analyzing biodiversity data, structure and functions of greenspaces data, analyzing remotely sensed spatial data, and harnessing citizen science and social media data.

We will emphasize the importance of understanding and analyzing how dynamic ecological and social forces shape urban ecosystems and the provision of ecosystem services. The module will benefit students interested in urban ecology and conservation science, and those interested in urban planning and urban environmental management.

**Intended Learning Outcomes:**

On successful completion of the module, students are able to:

1. conceptually understand urban ecosystem dynamics, specifically the changes and the processes that underly ecosystem dynamics;
2. critically analyze the effects of environmental disturbances on urban ecosystem energy and nutrient flows, biodiversity, regeneration processes and the potential to deliver ecosystem services;

3. apply methods in the field and lab to measure and evaluate processes within terrestrial and aquatic urban systems, but also within social systems to analyze human perceptions and values underlying cultural services;
4. communicate critical insights into the potential consequences of ecological engineering strategies applied to managing different urban ecosystems and landscapes;
5. develop a research proposal to investigate novel questions in urban ecology and urban planning.

### **Teaching and Learning Methods:**

The interactive module comprises a seminar (S) and an exercise (UE) / excursion (EX) to best combine lectures, case study analyses, group discussions, and presentations from guests and peers. The seminars will cover advanced concepts in lecture PowerPoint presentations but also through paper discussions and group work (3-5 students) on a range of topics (see above). Paired with a weekly topic, the exercises/excursions cover research methods that are based in experiential learning with foreseen excursions to field sites in Munich as well as laboratory work at TUM-WZW. Through field excursions and lab practical work, students will collect and analyze data to gain important methodological skills in conducting urban ecosystem and planning research.

### **Media:**

PowerPoint, films, virtual lectures, virtual activities, data scripts

### **Reading List:**

Barbosa, P. 2020. Urban ecology: its nature and challenges. CAB International, Boston, MA.  
Brown, R. D. and Gillespie, T. J., 1995. Microclimatic Landscape Design: Creating Thermal Comfort and Energy Efficiency. John Wiley & Sons.  
Carreiro, M M., Song, Yong-Chang and Wu, J. (eds.), (2008). Ecology, Planning and Management of Urban Forests. Springer: New York.  
Craul, P. J., 1999. Urban Soils – Applications and Practices. John Wiley & Sons.  
Ferrini, F., Konijnendijk van den Bosch, C., & Fini, A. (Eds.), (2017). Routledge handbook of urban forestry. London: Routledge.

### **Responsible for Module:**

Egerer, Monika; Prof. Dr.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Advanced Concepts and Methods in Urban Ecosystems (Seminar, 2 SWS)  
Egerer M [L], Egerer M, Pauleit S, Rahman M

Advanced Concepts and Methods in Urban Ecosystems (Übung, 3 SWS)  
Egerer M [L], Egerer M, Pauleit S, Rahman M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2721: Agriculture Raw Materials and their Utilization | Agriculture Raw Materials and their Utilization [ARM&U]

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module grade is assessed by a written exam (60 min). The students show that they have understood the principles of biomass production for bioenergy use, biomass supply chains, and the different bioenergy systems. The written exam demonstrates the student's ability to deal with questions, and calculations, complete figures or prepare sketches in regard to biomass production for bioenergy use.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

General understanding of natural science, mathematics and basics of technology.

#### Content:

The targets for the module "Agriculture Raw Materials and their Utilization" are impart a basic understanding of the possibilities and limitations for the agricultural production of biomass for energetic and industrial uses and to provide an overview of ecological impacts of diverse biomass and bioenergy utilization pathways.

The module comprises a lecture which deals with the following topics:

- Production of agricultural biomass and the most important energy and industry crops
- Biomass chains and uses
- Diverse bioenergy systems
- Bioeconomy & biorefineries (related to Agricultural products)

Ecological impact assessment of biomass and bioenergy utilization.

**Intended Learning Outcomes:**

At the end of the module students have acquired knowledge of the production and utilization of renewable resources from the agricultural and forestry sector.

They know how to analyze the performance and ecological impacts of different biomass supply and utilization chains. They can estimate the suitability of various crops for bioenergy use. The students have an insight in the physical and chemical basics of energy production from biomass and are able to apply related basic equations. They can compare different biomass combustion systems and attribute emissions. The students know the production pathways and properties of different biofuels for transportation and are able to estimate their future potentials. They understand the technological background of biogas production and can do basic designs of biomass supply and utilization chains using the example of biogas systems in agriculture.

**Teaching and Learning Methods:**

The lecture with integrated exercises and discussions will improve the understanding. During the lecture a power point presentation related to the lecture topics will be done from each student to improve the discussion in the different topics of the module.

**Media:**

Power point presentations, black board. Videos, Online Quiz.

**Reading List:**

Hijazi, O; Munro, S; Zerhusen, B; Effenberger, M. (2016): Review of life cycle assessment for biogas production in Europe. Renewable and Sustainable Energy Reviews (54), 1291-1300.

**Responsible for Module:**

Hijazi, Omar; Dr. rer. agr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Agriculture Raw Materials and their Utilization (Vorlesung, 4 SWS)

Hijazi O

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ2736: Analytical Characterization of Soil Resources | Analytical Characterization of Soil Resources

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The students hand in a research paper (10-15 pages), in which they present and discuss the analytical data obtained by own laboratory characterization of soil samples that were collected by the students themselves during a guided exercise in the field. The research paper is accompanied by an oral presentation (15-20 min) to assess the scientific communication skills of the students. For the final mark, the research paper accounts for 75% and the oral presentation for 25%.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

The successful completion of the module "Introduction to Soil Science" (WZ2733) or equivalent skills are required.

#### Content:

- Sampling and sample preparation
- Lab analyses: texture, density, water conductivity, organic and inorganic carbon, nitrogen, soil organic matter decomposition, pH, cation exchange capacity, Fe oxides, phosphate retention;
- Data interpretation

#### Intended Learning Outcomes:

The students are able to apply their knowledge of soils, as achieved in the module "Introduction to Soil Science", to the most important physical, chemical and biological processes in soils. They are able to choose the adequate

laboratory method to answer a certain question on soil management. They know how to do sampling, sample preparation and laboratory work. They can interpret laboratory data and know, which conclusions can be made and which conclusions cannot be made. The students are able to communicate their results in a written and an oral manner.

**Teaching and Learning Methods:**

For every step, the lecturers give the theoretical background. Afterwards, every step is done by the students themselves, guided by the lecturers and the laboratory staff: sampling, analyses, data interpretation.

**Media:**

Lecture: presentation notes; sampling: field equipment; laboratory course: laboratory instruments

**Reading List:**

will be given in the course

**Responsible for Module:**

Schweizer, Steffen; Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Analytical characterization of soil resources: Laboratory course (Übung, 3 SWS)

Prietzl J, Schweizer S, Bucka F, Göttlein A, Kolb E, Laniewski R, Leemhuis S, Höschen C

Analytical characterization of soil resources: Lecture (Vorlesung, 1 SWS)

Schweizer S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2757: Advanced Environmental and Natural Resource Economics | Advanced Environmental and Natural Resource Economics

Version of module description: Gültig ab summerterm 2017

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a written exam (90 min), a presentation (20 min) and a term paper (around 10 pages). The written exam shall give proof that the lecture content was understood and that it can be applied in exemplary exercises. Both the presentation and the term paper shall analyse a lecture topic in detail and place it in the economic environment. Weighting is as follows: 50 % written exam, 40 % term paper, 10 % presentation.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Environmental and Natural Resource Economics (recommended)

#### Content:

Dynamic optimization; Theory of optimal extraction of renewable and non-renewable resources; Theory of joint production; Application of game theory to resource management; Optimal growth and green accounting

#### Intended Learning Outcomes:

At the end of the module students have a profound knowledge of the economics of resource problems. They can derive the optimal time path to use renewable and non-renewable resources. They can explain how resources can be incorporated in the theory of optimal growth and how they can be accounted for in welfare and sustainability measurement. They can explain how some welfare enhancing effects are produced as a side effect of production systems. They are able to apply resource economic theory to real life resource problems. They know how to apply the basic concepts of game theory and how these can be used to explain the (im)possibilities of reaching international environmental agreements.

**Teaching and Learning Methods:**

Lectures will be used to teach the theoretical material. Exercises will be used to apply the theory taught in the lectures to solve problems and to facilitate a better understanding of the subject matter. In order to enable students to critically reflect on lecture topics, interactive elements are integrated (e.g. group work, case study).

**Media:**

Lecture notes, Excel

**Reading List:**

will be told in the lecture

**Responsible for Module:**

Sauer, Johannes; Prof. Dr. agr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Advanced Environmental and Natural Resource Economics (WZ2757) (Vorlesung, 4 SWS)

Sauer J [L], Canessa C, Mennig P, Villalba Camacho R

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI001190: Cooperation and Integration in Agribusiness | Cooperation and Integration in Agribusiness

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module assessment will be in the form of 120-minuten written exam. In the exam, students should demonstrate that they understand the theoretical concepts and apply relevant analytical methods to solve problems. In addition, the students should prove that they can analyze practical problems, assess the various forms of cooperation and networks in agribusiness, and develop appropriate solutions for strategic cooperation and integration.

#### Repeat Examination:

#### (Recommended) Prerequisites:

Basics of sustainability and organizational collaboration

#### Content:

The module deals with the complex forms and approaches of cooperation and integration in agribusiness in order to improve the performances of agricultural enterprises. Specific topics of the module are:

- Theoretical approaches and basics of cooperation and integration with a focus on the concept of institutional economics (resource-based theory, transaction cost economics, contract theory, principal-agent approach, value chain governance and interventions including certification programs)
- Strategic options of horizontal and vertical integrations
- Forms of customer, business relationship and stakeholder management
- "Lean Management" and corporate collaborations
- Sustainability in the agri-food value chain and entrepreneurial activities

### **Intended Learning Outcomes:**

Upon completion of the module, students will be able to:

- understand collaboration dynamics, challenges and problems as well as related solutions,
- use relevant qualitative and quantitative methods to analyze and improve business collaborations within the value chain,
- analyze and evaluate agribusiness related horizontal and vertical integrations,
- develop and design strategies for effective agri-food entrepreneurial collaborations and integrations.

### **Teaching and Learning Methods:**

Lecture with integrated individual exercises, group work and case study analysis.

The lecture is used to teach the theoretical concepts and approaches. Individual assignments, group work and case studies are used to work on specific empirical problems and to find solutions. This also includes learning through literature analysis.

### **Media:**

Presentations (power points), case analysis formats and scripts

### **Reading List:**

- Adebanjo, D. 2009. Understanding demand management challenges in intermediary food trading: a case study. *Supply Chain Management: An International Journal*, 14(3): 224 – 233
- Fischer, F., et al. (2010), Factors influencing contractual choice and sustainable relationships in European agri-food supply chains. *European Review of Agricultural Economics*, 36(4): 541-569
- Gall, R. G. and Schroder, B. (2006). Agricultural Producer Cooperatives as Strategic Alliances. *International Food and Agribusiness Management Review*, 9 (4): 26-44.
- Gereffi, G., Humphrey, J. and Sturgeon, T. (2005). The Governance of Global Value Chains. *Review of International Political Economy*, 21(1): 78-104
- Mugera, A. W. (2012). Sustained Competitive Advantage in Agribusiness: Applying the Resource-Based Theory to Human Resources. *International Food and Agribusiness Management Review*, 15(4): 27-48
- Peterson, C. et al (2001). Strategic choice along the vertical coordination continuum. *International food and agri-business review*, 4:149-166
- Polonsky, M.J. et al. (2002). A Stakeholder Perspective for Analyzing Marketing Relationships. *Journal of Market-Focused Management*, 5:109–126
- Porter, M.E. (1985), *Competitive Advantage: Creating and Sustaining Superior Performance*, Free Press, New York.
- Schulze, et al. 2006. Relationship quality in agri-food chains: Supplier management in the German pork and dairy sector. *Journal on Chain and Network Science*, 6:55-68
- Soon, J.M. and Baines, R.N. (2013). Public and Private Food Safety Standards: Facilitating or Frustrating Fresh Produce Growers? *Laws* 2: 1–19
- Trienekens, J. and Zuurbier, P. (2008). Quality and safety standards in the food industry, developments and challenges. *Int. J. Production Economics*, 113: 107–122

Torres, J. et al. (2007). An Evaluation of Customer Relationship Management (CRM) Practices Among Agribusiness Firms. *International Food and Agribusiness Management Review*, 10(1): 36-56

Walters, D. and Rainbird, M. (2007). *Strategic Operations Management*. Palgrave Macmillan

Weber, A. (2011). „Why do farmers spend different amounts of transaction costs in agri-environmental schemes?“

Williamson, Oliver E. 1979. Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, 22(2): 233–61.

The list will be expanded and updated using other thematically relevant books, journal articles and periodical newsletters and others.

**Responsible for Module:**

Sauer, Johannes; Prof. Dr. agr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Cooperation and Integration in Agribusiness (WI001190) (Vorlesung, 4 SWS)

Abate Kassa G [L], Abate Kassa G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1590: Climate Change Economics | Climate Change Economics

Version of module description: Gültig ab winterterm 2014/15

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

There will be a written exam (Klausur) of 90 minutes at the end of the semester. The students will be asked to demonstrate, within the stipulated amount of time using predefined methods and resources, their ability to outline the challenges climate change poses to regulators, propose pragmatic solutions and strategies as well as ways of implementing them. This would be based on the competences acquired from the relevant literature of economic modeling, theories of climate change and their understanding from the course content. The written exam is an appropriate assessment method to evaluate the degree to which the students understand the theoretical framework of climate change implications as well as provides an opportunity for them to put forward arguments based on existing theory.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge:

- Micro Economics (Welfare Economics)
- Environmental Economics
- Resource Economics

#### Content:

This course covers the trends in current and future climate change and their effects on economic and social outcomes.

The lectures are divided into ten sessions:

##### 1. Introduction to the Basic Science of Climate Change

- The students will learn about the scientific themes of global climate change and the economic dimension of the phenomenon.



## 2. Basic Economics

- The students will learn how a market economy can be efficient and socially optimal as well as about the prospects of externality.

## 3. Optimal Emission Levels

- The students will learn of the optimal abatement path and its uncertainty with respect to damages as well as Integrated Assessment Models (IAMs).

## 4. Intra-generational equity in climate policy

- The students will learn about how to account for equity across space (intergenerational equity) when deriving optimal emission levels.

## 5. International Environmental Agreements

- The students will learn about the dynamics behind common strategies towards achieving some form of optimal emission level.

## 6. Policy Instruments

- The students will learn about diverse instruments such as quality-based approach and Pigouvian Tax.

## 7. Regulation via Prices vs. Quantities

- The students will learn what circumstances will a regulator prefer prices over quantities and vice versa.

## 8. Credit-based Mechanisms

- The students will learn about how to deal with countries that do not want to commit, but have a high potential for low-cost reductions.

## 9. German Climate Policy

- The students will learn about German Climate Action - strategies and policies

## 10. European Union Emission Trading Scheme - EU ETS

### **Intended Learning Outcomes:**

After successfully completing the module, students are able to:

- Evaluate and formulate economic models related to climate change.
- Apply theoretical model to climate change regulations as well as policies that affect emission levels.
- Analyze the complexity, uncertainty and possibilities associated with optimal emission level.
- Apply appropriate instruments for optimal emission level that are efficient and cost-effective.
- Understand climate negotiations (club) and climate action strategies are currently being implemented.

### **Teaching and Learning Methods:**

The course mainly consists of lectures (4 SWS). The lecture will provide a foundation upon which to build the ensuing discussions on climate change issues from an economic perspective. The content of the module is expected to be transferred to the students in an interactive learning manner were, among others, emission reduction instruments are scrutinized. This encourages the students to independently and self-reliantly study the literature guided by a structured framework.

### **Media:**

PowerPoint, flipchart, internet portals, online reports etc.

**Reading List:**

Bréchet, T., & Eyckmans, J. (2009). Coalition theory and integrated assessment Modelling: Lessons for climate governance. *Global Environmental Commons: Analytical and Political Challenges in Building Governance Mechanisms*.

Rohling, M., & Ohndorf, M. (2012). Prices vs. quantities with fiscal cushioning. *Resource and Energy Economics*, 34(2), 169-187.

MacKenzie, I. A., & Ohndorf, M. (2012). Optimal monitoring of credit-based emissions trading under asymmetric information. *Journal of regulatory economics*, 42(2), 180-203.

Hake, J. F., Fischer, W., Venghaus, S., & Weckenbrock, C. (2015). The German Energiewende—history and status quo. *Energy*, 92, 532-546.

Climate Action Plan 2050 Principles and goals of the German government's climate policy. [https://www.bmu.de/fileadmin/Daten\\_BMU/Pools/Broschueren/klimaschutzplan\\_2050\\_en\\_bf.pdf](https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/klimaschutzplan_2050_en_bf.pdf)

EU ETS Handbook. [https://ec.europa.eu/clima/sites/clima/files/docs/ets\\_handbook\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/docs/ets_handbook_en.pdf)

**Responsible for Module:**

Sauer, Johannes; Prof. Dr. agr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Climate Change Economics (WZ1590, englisch) (Vorlesung, 4 SWS)

Sauer J [L], Canessa C, Frick F

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2730: Climate Change - Science, Impacts and Adaptation, Mitigation | Climate Change - Science, Impacts and Adaptation, Mitigation

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Assessment consisting of oral examination (30 min) on the lecture and the seminar. In this oral examination the student is expected to demonstrate that he/she has understood the physical basis of the climate system and that they can identify the drivers of climate change. The student shows that he/she is able to apply his/her knowledge to develop adaptation and mitigation measures and to argue in discussions on climate change issues. A voluntary mid-term assignment (presentation) in the seminar assesses the students' ability to summarize findings from scientific publications / case studies and to present them to an audience. The presentation is complemented by the preparation of a "PICO" that is presented on an interactive screen. The presentation will serve for grade improvement by 0.3 according to §6(5) APSO.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in meteorology, physics, biology.

#### Content:

Based on the newest IPCC report (AR 5) the theoretical background on the physical science basis of climate change, theory and practical application of adaptation and mitigation measures in biological, physical and chemical systems will be presented. In a related seminar, selected topics will be intensified in case studies. TUM as a NGO in the UNFCCC process offers an optional possibility also for students to take part in COP and related negotiations.

#### Intended Learning Outcomes:

After this module, the students can understand the physical basis of the climate system, identify all drivers of climate change and falsify common arguing of "climate sceptics". They can summarize

observed changes in the climate system as well as impacts in diverse systems and regions. They are able to assess cross-sectorial impacts of climate change in selected areas, to evaluate and develop adaptation and mitigation measures and strategies in biological, physical and chemical systems including an analysis of their effectiveness and cost-effectiveness.

**Teaching and Learning Methods:**

Lecture on physical basis of the climate system, impacts of climate change and important mitigation strategies. In the seminar group presentations of various topics regarding adaptation and mitigation of climate change will be presented as case studies. Optional excursion to UNFCCC meeting if applicable.

**Media:**

Lecture with PowerPoint Presentation, reader and exercises. Group work in seminar including problem driven case studies and student presentations, excursion.

**Reading List:**

IPCC (2013) Fifth Assessment Report of WGI, II, III. Houghton (2015) Global warming, the complete briefing. Most recent scientific literature.

**Responsible for Module:**

Rammig, Anja; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Ecological, social and economic aspects of CC impacts, adaptation and mitigation on different scales (Seminar, 2 SWS)

Estrella N [L], Menzel A, Estrella N

Climate Change - The complete briefing (Vorlesung, 2 SWS)

Rammig A [L], Buras A, Krause A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS20022: Experimental Methods in Soil and Plant Hydrology | Experimental Methods in Soil and Plant Hydrology

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination is performed as a graded laboratory assignment. The grade for this module is determined by two factors. Firstly, the student's participation in conducting the planned experiments, collecting and analyzing data, and presenting the results to their peers, will contribute 40% towards the final grade. Secondly, students are expected to prepare an individual report, summarizing the findings of their analysis and measurements, which will make up 60% of the final grade. The report should be 10-20 pages in length and should be submitted by the end of semester.

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

Students interested in this module are recommended to visit first the lecture on Soil Biophysics (offered by the Professorship for Soil Biophysics and Environmental Systems) or any other equivalent lectures such as Introduction to Soil Science or Introduction to Soil Physics during their master and bachelor studies.

#### Content:

In this module, students will gain an understanding of how to experimentally quantify the physical and hydrological properties of soils and plants. Specifically, students will learn:

1. To assess basic soil physical properties such as soil texture, moisture, porosity, and density.
2. To determine the water retention and flow characteristics of various soils.
3. To investigate the infiltration and evaporation of water from different soils.
4. To evaluate plant responses to soil drying, such as transpiration rate, stomata conductance, and xylem leaf water potential.

5. To utilize various sensors and techniques to measure water content and water potential within soil and plant systems.

**Intended Learning Outcomes:**

Upon completion of the module, students will possess the ability:

1. To experimentally measure the physical and hydrological properties of soils.
2. To utilize advanced experimental methods and tools to quantify physical and hydrological properties of soils, including soil particle size distribution, soil retention curve, soil hydraulic conductivity curve, and water flow within soils and plants.
3. To experimentally compare the physical and hydrological properties of various soils.
4. To experimentally evaluate the response of plants to soil drying in various soils.

**Teaching and Learning Methods:**

This module is designed as a practical course, in which students will learn how to experimentally quantify the physical and hydrological properties of soils and plants. To achieve this, students will be divided into three groups. Two soil samples with contrasting textures will be selected, and each group will be assigned one sample. This means that there will be three replications of the two soil types, each managed by a different group.

In the first part of the practicum, students will be instructed in the quantification of soil physical properties that impact water retention and flow.

In the second part, students will grow plants in the two different soil textures and measure soil and plant water relations by determining the transpiration rate of the plants, the leaf water potential, soil water content, and soil water potential during soil drying cycles.

**Media:**

**Reading List:**

**Responsible for Module:**

Zare, Mohsen, Prof. Dr. mohsen.zare@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Advanced experimental methods in soil and plant hydrology (Forschungspraktikum, 4 SWS)

Zare M [L], Zare M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### POL62200: Energy Transformation | Energy Transformation

Version of module description: Gültig ab winterterm 2017/18

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

For this module, evaluations will be based on written work and a presentation. The written assignment for the module will be of a length of approximately 20-25 pages. The topic of the module paper is to be developed in consultation with the seminar leaders and will deal with a specific topic of the seminar (energy transformation) and its technological, political, and social dimensions. The paper will be introduced with a precise question and then analyzed in depth. The methodology of research needs to be indicated and a comprehensive bibliography included. Students will be expected to prepare and give a presentation of at least 20 minutes tied to a session topic. Group presentations of up to three students are possible as long as individual contributions are discernible.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Ring lecture „Politics & Technology“

#### Content:

For a variety of reasons, including energy security, environment and climate concerns, and the potential to develop new technologies and processes, cities, countries and entire regions are pursuing low-carbon energy transitions. Understandings of what the best approach to a low carbon energy transition is, however, vary widely. The extent to which energy transitions are occurring in various sectors (power, heating/cooling, transportation) differs significantly. Why is this the case? What factors support or inhibit the scaling-up of policy solutions? What are the challenges associated with large scale energy system transformations? How similar or different are energy system transformations to other major transformations which have occurred in the past or which may need to occur in the future? This module will consider these and other questions in the context of Germany, at the European level and internationally.

### **Intended Learning Outcomes:**

After participating in this module, students will understand the arguments underpinning decisions to pursue low carbon energy transitions, how low carbon energy transitions are affected by broader economic, technological, and political factors, and the ways in which actors at the local, national, or international level may act to promote or inhibit change. They will have gained insights into system transformation thinking, understand aspects of the production, distribution and utilization of energy and their interplay; apply methods of comparative policy analysis to energy policy in different political systems; be able to identify challenges of policy-making in national politics and the European multi-level system; to critically analyze energy policy in Germany, Europe, and internationally (for example in China, Japan, India, the United States as well as at the global level); to analyze the factors determining German, European, and international energy politics, and to evaluate the effects of different energy policy governance instruments (like legal regulation, planning, incentive design, taxes, subsidies, etc.).

### **Teaching and Learning Methods:**

The module is offered in the form of two seminars, each dealing with different, but complementary thematic areas. One will be focused more on the transition of the energy systems in Germany and Europe while the other will concentrate more on the international and global level. To obtain a deeper understanding of the module's topics a combination of independent work and general discussion will be used in the seminar. Seminars will include both direct input from the instructor and a wide variety of active learning methods. During the seminars, there will be in-depth discussions and inputs by students. Concrete examples will be used to practice, analyze, and evaluate the material which has been presented. Both the technical and scientific aspects of issues as well as their political and social implications will be discussed. The presentations developed and given by the students and ensuing discussions will contribute to the students' understanding of the seminar materials and instructor's inputs.

### **Media:**

Online-Reader, PowerPoint

### **Reading List:**

Moe, Espin. 2015. Renewable Energy Transformation or Fossil Fuel Backlash: Vested Interests in the Political Economy. Palgrave MacMillan.

Araújo, K., ed. 2022. Routledge Handbook of Energy Transitions. Routledge.

A reader of seminar texts with up-to-date and cutting edge scientific literature will be made available at the start of the semester.

### **Responsible for Module:**

Schreurs, Miranda; Prof. Dr.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

(POL62200) Energy Transformation (Seminar 1 + 2) (Seminar, 4 SWS)



Cetkovic S ( Mohammed N )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### SOT86700: EuroTeQ Collider - Leave no Waste Behind (Master) | EuroTeQ Collider - Leave no Waste Behind (Master)

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

During this module, students must complete following tasks: producing a presentation that provides information on the project concept development and implementation, as well as a final report, charting the progress of their work/research over time. These assessments will evaluate a) the success of the project and b) the learning success of the students in oral and written form.

Students will be graded based on the active participation in a group project (20%), a final presentation of project results (60%) and a final project report (20%). These examination requirements will assess the success of the project, but also examine the learning success of the students in oral and written form.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

This module is aimed at all students enrolled in a Bachelor or Master program at the TUM; it is thus designed as an interdisciplinary venue which brings together a range of scientific perspectives. No specific prior knowledge is required; however, its project-based character requires high levels of intrinsic motivation and the willingness to actively participate in a project.

#### Content:

The way we live today produces a lot of waste. Aware of this fact, many initiatives try to stop this trend and reduce the amount of waste left by mankind. But there is still a lot to do! Waste is everywhere, not only in the use of packaging, in the over-use of natural resources, in the unuse of surplus or in the non-management of certain types of waste (chemical, nuclear). It also results from non-optimization of certain processes (energy loss during electricity production, extraction efficiency of certain materials), in our inability to find sustainable alternatives (fossil fuels) or to

consume differently (buy rather than repair). The process of waste reduction just began, and in order to succeed in leaving no waste behind, what will your contribution be?

The Technical University of Munich (TUM) joint forces with six leading universities of science and technology to foster the European spirit in a EuroTeQ format to promote innovative engineering education across Europe. Together we are creating the first EuroTeQ Collider in 2022. The Collider is an innovative learning format with the aim of bringing students together with vocational trainees and professionals to tackle challenges around the theme "Leave no waste behind". The goal is to connect participants with different profiles and personalities to boost creativity, innovation, shared understanding, enabling participants to imagine new approaches and design disruptive solutions. The module is a seminar which gives students the opportunity to apply their knowledge on topics related to the theme "Leave no waste behind". Within this overarching theme, we are offering challenges on three different topic-domains, namely:

- Cities (eg. construction/ building, public lighting, streets (trash bins))
- Energy (eg. renewable resources, transport, data (storing))
- Consumption (eg. food, plastics, fashion).

Within every topic domain, interdisciplinary (and international) teams of students, vocational trainees and professional learners are formed to develop solutions towards a desirable future, test and validate tools and create prototypes of their solutions.

A selection of the best projects will be presented in a major high-level event, the EuroTeQaThon. The winner teams of the EuroTeQaThon will be invited to present their projects at the European Commission.

### **Intended Learning Outcomes:**

After completion, all EuroTeQ Collider participants will be able to:

- Select and apply appropriate design, engineering and business approaches and tools to create an innovative and science-based solution to a real-life challenge.
- Develop a profound interpretation of a complex, real-life problem and its context using a system-thinking approach, considering multiple perspectives.
- Develop a problem-driven, creative, and integrative design, demonstrated by a concrete prototype that balances desirability, feasibility, and viability.
- Use disciplinary knowledge and expertise in an inter-disciplinary team to develop an innovative and scientifically sound solution in a European context.
- Communicate your ideas, at different levels of elaboration, via several mediums in an international context to a diverse set of stakeholders.
- Define and regularly reflect on personal and team development

### **Teaching and Learning Methods:**

A range of teaching & learning techniques will be applied:

- (pre-recorded) videos and online presentations, with podcasts and interviews, Q&A Sessions with experts
- This module is focusing on service-learning and project-based learning
- After a set of introductory sessions which provide input on the core topics but also project management, students will work on their projects in groups. Progress will be determined through

project presentations during the semester, continuous feedback from the instructors, as well as peer-to-peer feedback. –

- Presentational skills will be further facilitated through the requirement to present the final results
- As students and professionals will work together in a joint effort, all participants will not only improve their technical skills but also enhance their soft skills such as team spirit, flexibility to work in multicultural environments, and design thinking, which are also very important in professional life.

**Media:**

**Reading List:**

**Responsible for Module:**

Wurster, Stefan; Prof. Dr. rer. pol.

**Courses (Type of course, Weekly hours per semester), Instructor:**

(SOT82700, SOT86700) EuroTeQ Collider - Leave no Waste Behind (Seminar, 4 SWS)

Becker V, Wurster S ( Schmid H )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI000286: Environmental and Natural Resource Economics | Environmental and Natural Resource Economics

Version of module description: Gültig ab summerterm 2017

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning success will be assessed by a written exam (120 minutes)..

By answering the questions, students show that they are able to understand the economic view of environmental and resource problems. Furthermore students show that they are able to compare and evaluate alternative economic instruments (e.g. taxes, emission permits, payments for environmental services). They show their ability to apply environmental policy instruments and valuation methods to the use of natural resources and specific pollution problems. Finally students demonstrate that they are able to conduct and interpret economic cost-benefit analyses.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

A basic knowledge in Microeconomic theory is recommended

#### Content:

Building on the analysis of economic growth, we examine the interactions between economic growth and the environment. We analyse economic reasons for pollution problems and overexploitation of natural resources. We then examine economic conditions for a sustainable use of renewable and non-renewable resources. We discuss the suitability of economic policy instruments for reducing pollution and using natural resources more sustainably. In this context, we compare the economic efficiency of command and control measures with market-based instruments such as pollution taxes, emission trading and payments for environmental services. Next, we present monetary valuation methods for environmental non-market effects to empirically assess the economic performance of policy initiatives in the context of cost-benefit analysis.

**Intended Learning Outcomes:**

At the end of the module the students are able to understand the economic view of environmental and resource problems. They know alternative economic instruments, e.g. taxes, emission permits, payments for environmental services and how they work and are able to compare them regarding their economic efficiency. They know and can apply specific valuation methods to attach a monetary value to environmental effects and conduct and interpret economic cost-benefit analyses.

**Teaching and Learning Methods:**

The module will be held in the form of lectures which are partially combined with group discussions and exercises. The main learning objective is here to understand the economics of environmental policy. Lectures are a format suitable to convey theoretical knowledge about the welfare implications of policy interventions. Integrated exercises will help students to apply acquired knowledge to concrete problems and derive economically sound answers.

**Media:**

**Reading List:**

Jaeger, W.K. (2005): Environmental Economics. Island Press.  
Kahn, J. R. (2006). The economic approach to environmental and natural resources, 3rd edition. South-Western, Mason.  
Mankiw, N.G. and M.P. Taylor (2011): Microeconomics. 2nd Edition. South Western.  
Perman, R., Y. Ma, J. McGilvray, M. Common (2003): Natural Resource and Environmental Economics. 3rd Edition. Pearson Education Limited.  
Tietenberg, T. and L. Lewis (2010): Environmental Economics & Policy. Prentice Hall.  
Wacker, H. and Blank, J. (1999): Ressourcenökonomik. Band I: Regenerative natürliche Ressourcen. R. Oldenbourg Verlag, München.  
Wacker, H. and J. Blank (1999): Ressourcenökonomik. Band II: Erschöpfbare Ressourcen. R. Oldenbourg Verlag, München.

**Responsible for Module:**

Glebe, Thilo; PD Dr. habil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI001204: Economics of Water Use, Regulation and Markets | Economics of Water Use, Regulation and Markets

Version of module description: Gültig ab winterterm 2018/19

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In a written examination at the end of the semester of 120 mins (in class), students will demonstrate the ability to understand and analyze concepts and methodological approaches related to water resource management using economic terminology, and the ability to apply mathematical tools to solve specific calculus problems. A written exam is necessary to assess the students' holistic understanding and analytical competencies. Students will have to option to give an in-class presentation (~15 min) of a short research project related to water resource economics that they will choose from a list of references provided by the instructor. Students who are interested in participating in the research project activity will have to express their interest and choose a topic by the third week of the course. The in-class presentation (mid-term assignment) is optional and improves the final grade by 0,3. The extra credit from the in-class presentation cannot be transferred in the case of re-examination.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Students taking this course should be familiar with the basics of microeconomics as well as mathematical economics (derivatives, basic function integrals and graphs). However, all necessary concepts will be introduced before application.

#### Content:

The course will examine the incentives that lead to overexploitation of water resources and how altering these incentives can promote socially optimal use patterns. The course will also provide the students with a set of analytical tools that can be used to work on water issues or natural resource issues more broadly.

Those topics are:

1. Introduction and Economics Basics
2. Agricultural Water Use  
(water rights, agricultural water use efficiency and productivity, land allocation, technology choice, environmental quality)
3. Residential Water Use
4. Water, Land Use and Environmental Aspects of Biofuel Production
5. Other Approaches to Value Water  
(hedonic modelling, experimental economics, nonmarket valuation approach)
6. Intertemporal and Interregional Aspects of Water
7. Water Markets Around the World  
(Europe, China, USA)

### **Intended Learning Outcomes:**

This course is designed to introduce students to the subject of water economics.

Upon successful completion of the module, students will be able to:

- understand the basic concepts and economic models used to study the economics of water resources issues.
- select and apply the appropriate economic model to solve water policy problems as for example producer's profit or consumer's utility maximization.
- provide economic intuition for mathematical answers to water management problems.
- apply models to address a wide range of water resource problems and assess the economic effects of decision making process at different levels based either on the water demand or the water supply side of the economy.
- critique journal articles pertaining to economics of water resources.

### **Teaching and Learning Methods:**

Theoretical concepts and example exercises will be given by the lecturer on the blackboard and by PowerPoint presentations to build the required knowledge base in water resource economics. Q&A sessions at the beginning of each lecture will be provided to recapitulate the previous lecture. In addition, under the supervision and help of the lecturer, in-class application exercises will be used to create real-world water management problems for which students in randomly assigned groups will create and solve problems. Discussion of relevant scholarly articles and literature will be used to aid understanding of the topic covered.

### **Media:**

Presentation slides, Blackboard, hand-outs, Moodle course to provide materials (pdf of papers to read)

### **Reading List:**

Auffhammer, M. et al., "The Value of Supply Reliability in Urban Water Systems," Journal of the Association of Environmental and Resource Economists, Working paper.

Caswell, M. & D. Zilberman, "The Effects of Well Depth and Land Quality on the Choice of Irrigation Technology," American Journal of Agricultural Economics 68(1986): 798-811.



Chong, H. & D. Sunding, "Water Markets and Trading," Annual Review of Environment and Resources 31(2006): 239-264.

Gisser, M., "Groundwater: Focusing on the Real Issue," Journal of Political Economy 91(1983): 1004-1027.

Green, G. et al., "Explaining Irrigation Technology Choices: A Microparameter Approach," American Journal of Agricultural Economics 78(1996): 1064-1072.

Renwick, M. & R. Green, "Do Residential Demand Side Policies Measure Up? An Analysis of Eight California Water Agencies," Journal of Environmental Economics and Management 40(2000): 37-55.

Zilberman, D. et al., "Changes in Water Allocation Mechanisms for California Agriculture," Contemporary Economic Policy 12(1994): 122-133.

The list will be expanded and updated using material from a variety of textbooks and journal papers corresponding to each of the topics.

**Responsible for Module:**

Sauer, Johannes; Prof. Dr. agr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Economics of Water Use, Regulation and Markets (WI001204, englisch) (Vorlesung, 4 SWS)

Sauer J [L], Vrachioli M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ0228: Exercises in Precision Agriculture and Plant Phenotyping | Exercises in Precision Agriculture and Plant Phenotyping

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination uses the format of Report (project report + presentation), in which students should demonstrate that they are able to apply the gained skills to address certain questions in research or applications, in the context of (but not limited to) precision agriculture and plant phenotyping. The final grades are calculated from the following elements:

- On the topic of choice, each group of students (e.g., 3-4 persons but can also be solo) writes a project report (8-10 pages of A4 single line format, excluding references) (75% of the total grade), and
- Each group presents project results in 15 min following 5 min discussion (25% of the total grade).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

- Knowing the basics of scientific programming (e.g., R, Matlab) is recommended.
- Knowledge gained in the course module "Precision Agriculture" is recommended, but not mandatory.

#### Content:

The module aims to transfer the practical methods and skills of using novel technologies for precision agriculture and plant phenotyping. Main topics include:

1. cameras, sensors, and integrated systems used in precision agriculture and plant phenotyping;
2. basics of using Matlab, R, and other related software packages;
3. drone (UAV) operation, image data acquisition and analysis pipeline;
4. spectrometer operation, plant and soil spectral measurements, and spectral data analysis;
5. digital image analysis methods and software packages;

6. GIS tools for spatial data analysis and visualization;
7. satellite imagery data acquisition, processing, and analysis;
8. detection of plant biotic and abiotic stresses using different sensors;
9. measuring field spatiotemporal variability and crop yield;
10. data science methods in precision agriculture and plant phenotyping;

### **Intended Learning Outcomes:**

Upon completion of the module, students will be able to:

- understand the basics of characterizing plant traits and crop field variability using non-destructive methods;
- apply basic sensors and software packages (e.g. R, Matlab) in practices;
- evaluate the potentials and limitations of different sensors and data science methods (e.g. for image segmentation and classification);
- design sensing and data analysis pipelines for solving practical problems;
- develop critical and systematical thinking skills;
- to present their results in a clear and comprehensible manner to an audience

### **Teaching and Learning Methods:**

- The module delivers the practical skills of precision agriculture and plant phenotyping through demonstrations of operational and analytic methods, hands-on practices, and computer exercises.
- Students actively participate in the exercises and discussion, and write learning journals to reflect the critical aspects in the exercises, e.g., application potentials and limitations of methods.
- Students conduct exercises through teamwork, write reports on topics of choice, and present the results and discuss with classmates.

### **Media:**

Zoom, Scripts, PowerPoint

### **Reading List:**

- Current literature related to the topics

### **Responsible for Module:**

Yu, Kang; Prof. Dr. rer. nat.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Plant Phenotyping and Precision Agriculture Exercises (Übung, 4 SWS)

Camenzind M, Mokhtari A, Yu K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1876: Entrepreneurship in the Agricultural and Horticultural Industry | Entrepreneurship in der Agrar- und Gartenbauwirtschaft

Version of module description: Gültig ab winterterm 2018/19

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module examination consists of a 120-minute written exam. This will focus on testing the holistic understanding and competence with regard to the conceptual and methodological approaches in agri-food entrepreneurship.

In addition, students will analyze business start-up processes and risks in the innovation and product development process, assess entrepreneurial cooperations in the agricultural and horticultural sector, and design associated management and organizational structures.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Fundamentals of Microeconomics, Market analysis

#### Content:

The module covers and discusses the principles, theoretical approaches and significance of entrepreneurship orientations to support the application of innovations and start-up related economic activities in the agricultural and horticultural value chains and industries. The course specifically includes the following topics:

- Principles of entrepreneurship and entrepreneurship orientations in the agricultural and horticultural industries.
- Innovation and product development processes and related entrepreneurial opportunities and risks
- Entrepreneurial strategies and collaborations in the venture creation process

- Methodological approaches (e.g. attribute mapping, strategy canvas and various business model and quantitative approaches) to explain and evaluate entrepreneurship-related activities and venture creation processes
- Sustainable entrepreneurship

### **Intended Learning Outcomes:**

After successful completion of the module, students will be able to:

- understand the principles of entrepreneurship and business creation in the agricultural and horticultural sector,
- use qualitative and quantitative methods to explain and evaluate entrepreneurship related activities,
- analyze the risks and opportunities in innovation and product development,
- assess collaborations and strategies in entrepreneurship and business creation, and
- develop venture creation processes, associated management, and organizational structures.

### **Teaching and Learning Methods:**

With the help of lectures, the theoretical approaches and concepts of entrepreneurship and the business start-up process are taught. Group work and presentations are used to describe and work on practical problems and proposed solutions.

### **Media:**

Presentations, case descriptions, scripts

### **Reading List:**

- Ardichvili, A., Cardozo, R., & Ray, S. (2003). A theory of entrepreneurial opportunity identification and development. *Journal of Business Venturing*, 18: 105–123.
- Berti, G. and Mulligan, C. (2016). Competitiveness of Small Farms and Innovative Food Supply Chains: The Role of Food Hubs in Creating Sustainable Regional and Local Food Systems. *Sustainability*, 8 (616): 1-31.
- Bolton, W.K. and Thompson, J.L. (2000). *Entrepreneurs: Talent, Temperament, Technique*. Butterworth Heinemann, Oxford.
- Casson, M., (2003). *The Entrepreneur*, New York, NY: Edward Elgar Publishing.
- Dunkelberg, et al. (2013). Do entrepreneurial goals matter? Resource allocation in new owner-managed firms. *Journal of Business Venturing*, 28: 225–240.
- Grichnik, D. (2006). *International Entrepreneurship: Entscheidungs- und Risikoverhalten von Unternehmensgründern und Venture-Finanziers in kulturellen Kontexten — Theoriebildung und empirische Analysen*. Berlin: Duncker & Humblot-Verlag.
- Howieson, et al. (2014). New Product Development in Small Food Enterprises. *Journal of New Business Ideas & Trends*, 12(1): 11 - 26.
- Joakim, T. et al. (2016). Business model innovation in the agri-food sector: a literature review. *British Food Journal*, 118(6): 1462-1476.
- Kim, W.C. and Mauborgne, R. (2005). *Blue Ocean Strategy*, Harvard Business School Press: Boston.

Shane, S. and Venkataraman, S. (2000). The Promise of Entrepreneurship as a Field of Research, *Academy of Management Review*, 25(1): 218–228.

McGrath, R. G. and MacMillan, I. (2000). The Entrepreneurial Mindset: Strategies for Continuously Creating Opportunity in an Age of Uncertainty.

Mirzaeia, O. et al. (2016). Product and Marketing Innovation in Farm-Based Businesses: The Role of Entrepreneurial Orientation and Market Orientation. *International Food and Agribusiness Management Review*, 19(2): 99-130.

Morris, et al. (2017): Farm diversification, entrepreneurship and technology adoption: Analysis of upland farmers in Wales. *Journal of Rural Studies* 53: 132-143.

Shadbolt, M.N. and Olubode-Awosola, F. (2016). Resilience, Risk and Entrepreneurship. *International Food and Agribusiness Management Review*, 19(2): 33-52 .

Sporleder, et al. (2008). Innovation in Food Products: First-mover Strategy and Entropy Metrics. *International Food and Agribusiness Management Review*, 11(3): 139-164.

York, G.J. and Venkataraman, S. (2010). The entrepreneur–environment nexus: Uncertainty, innovation, and allocation. *Journal of Business Venturing*, 25: 449–463.

Die Liste wird anhand von weiteren thematisch relevanten Büchern, Zeitschriftenartikeln und aktuellen Themen aktualisiert

**Responsible for Module:**

Getachew Abate Kassa [getachew.abate@tum.de](mailto:getachew.abate@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2724: Emission Control in Land-Use and Animal Husbandry | Emission Control in Land-Use and Animal Husbandry

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The oral examination will be held either as an individual or a group examination. If more than 40 students sign in for the examination the oral examination can be done in a written form (Klausur, 90 min). The duration of the oral examination is 20 min per person. The Students are able to describe typical agricultural production, the environmental impact and the measurement procedures to quantify and to qualify these impacts. On that basis they are able to weigh the advantages and disadvantages of possible measures of air pollution in agriculture.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Interest in the field of agriculture; willingness to learn about the causal relation between agriculture and emission control.

#### Content:

Upon completion of the module, students are able to understand and analyze:

- the principle of agriculture in plant and livestock production on a basic level
- the main emissions caused by agricultural processes on a deeper level
- interactions of agricultural processes with the emission
- the environmental effects of these emission
- the measurement procedures to qualify and quantify agricultural emissions
- possibilities of emission abatement in land-use and animal husbandry.

#### Intended Learning Outcomes:

At the end of the module students are able to:

- understand the interrelation between local causes and global impacts,

- apply the comprehension of basic physical, chemical, and biological principles to phenomena in practice,
- evaluate measurement techniques in a qualitative manner,
- evaluate measures and techniques of environment protection;
- understand the interrelation between animal husbandry and air pollution control,
- derive adequate measures of environmental protection.

**Teaching and Learning Methods:**

Lecture, practice course.

**Media:**

PowerPoint-slides, short clips.

**Reading List:**

Tba

**Responsible for Module:**

Dr. Stefan Nesor – Bavarian State Research Center for Agriculture; Institute for Agricultural Engineering and Animal Husbandry; Voettinger Strasse 36, 85354 Freising, 0049 8161 713566; stefan.nesor@lfl.bayern.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Emission control in Land-Use and Animal Husbandry (Vorlesung, 3 SWS)

Nesor S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ2732: Environmental Monitoring and Data Analysis | Environmental Monitoring and Data Analysis

Version of module description: Gültig ab summerterm 2023

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 75	<b>Contact Hours:</b> 75

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Upon completion of the module, the students have a profound understanding of key aspects of environmental monitoring and are able to choose appropriate as well as to efficiently run environmental measurements, to reproducibly analyze acquired data and to clearly communicate results of environmental measurements.

The examination of the module will be in the form of a written examination (Klausur, 180 min); which consists of two sub parts: first a written part (40%, approx.60 minutes) on monitoring concepts and second a programming part on handling environmental monitoring datasets (60%, approx. 120 minutes).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in R is recommended.

#### Content:

1 Environmental monitoring including principles, techniques and management issues used in environmental monitoring and assessment; Observing, recording, communicating and archiving collected data and providing it to project stakeholders in order to identify sustainable and responsible environmental practices.

Optional: short course Aerobiology, GAW program, visit of companies

2 Environmental data analysis

Introduction to data analysis with R; Principles of reproducible research and implementation with R; Pipelines for environmental data analysis from obtaining data via cleaning and transforming to modelling and visualization with modern R; Coverage of data retrieval from different storage types for climate, proxy, phenology, and other data (text- based, netCDF, data bases); Modeling and visualization as complementary strategies for hypothesis-driven data analysis, based on published research from different fields of environmental sciences

**Intended Learning Outcomes:**

After this module, the students can plan, implement and run environmental measurements. They are able to efficiently analyze environmental data sets, including download and import of data sets and visualization and modelling with R.

**Teaching and Learning Methods:**

Course 1 is a combined lecture and exercise sessions where students will work on applied case studies and exercises related to environmental / meteorological monitoring.

Course 2 then offers combined lecture and exercise sessions at the PC lab on how to efficiently analyze those environmental data sets of course 1.

**Media:**

PowerPoint Presentation, Field work, Interactive documents for data analysis

**Reading List:**

Beginner level tutorials for Swirl (<http://swirlstats.com/>)

**Responsible for Module:**

Menzel, Annette; Prof. Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Environmental monitoring and data analysis; ecological data analysis (Vorlesung mit integrierten Übungen, 3 SWS)

Menzel A [L], Buras A

Environmental monitoring and data analysis; ecological monitoring (Vorlesung mit integrierten Übungen, 2 SWS)

Menzel A [L], Lüpke M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### **BGU62039: Case Studies of Sustainable Urban Developments and Infrastructure | Fallstudien nachhaltiger Quartiers-, Stadt- und Infrastrukturentwicklungen [FNQSI]**

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### **Description of Examination Method:**

The examination performance is achieved by writing a scientific paper in the form of an essay (about 5-7 pages). This is worked on in groups of 2-3 students. At the end of the semester, the results are presented in a graded short lecture and finally discussed.

The aim is to demonstrate that the students have understood and can critically reflect on the essential aspects of how sustainable neighborhood, urban and infrastructure development was implemented in the case study and that they can present their findings in an appropriate form.

The overall grade of the module is composed of the essay (70%) and the short presentation (30%). The examination is done online: the essay is uploaded on Moodle and the presentations take place via ZOOM.

#### **Repeat Examination:**

Next semester

#### **(Recommended) Prerequisites:**

The contents of the modules

BV620007 Fundamentals of sustainable construction

BV000029 Traffic engineering and traffic planning basic module

BV000031 Urban water and waste management basic module

should be familiar to the students

### **Content:**

In this module, the connections between urban planning and engineering as well as architectural concepts and the energy, material and traffic flows associated with them are shown and, above all, their implementation is dealt with in more detail.

Individual projects in the field of building construction and civil engineering as well as infrastructure systems and settlement quarters are examined and analyzed in more detail. The implementation of these projects, taking into account the location, social and societal aspects, as well as the integration of energy and political issues, are examined in a practical manner using case studies. The new building as well as projects of the reorganization, projects in the range plus energy house, zero-emission quarters are consulted.

Here, the criteria of sustainability are exemplarily dealt with in the phases of planning, construction, operation and deconstruction, in order to be able to evaluate buildings, structures, systems and developments in an active discussion in the future.

### **Intended Learning Outcomes:**

After attending the module, students will be able to:

- apply the criteria for sustainability on the basis of exemplary projects and understand their influence on and interactions with the parameters involved.
- understand sustainable developments in cities and neighborhoods as well as civil engineering and building construction from spatial, structural, material, cultural and social aspects.
- evaluate the different subsystems such as infrastructure, building stock, new construction, urban planning framework, energy supply, traffic, mobility, water, waste, food, education, social structure, resources/ cycles at neighborhood level, microclimate, quality of life, social structures, use structures, economic structures.
- Understand concepts of active and passive building technology as well as intelligent building envelopes and building control systems.
- to understand factors such as comfort, climate, energy consumption, finiteness of resources and CO2 emissions and their mutual influence.
- understand scenic analyses and examples and apply them to other properties with their own proposed solutions.

### **Teaching and Learning Methods:**

The module consists of a lecture series and a seminar.

In addition to the lecturers, external experts from science and practice are involved in the lecture series. The various actors in urban development provide the students with practical insights into the different subsystems of the city and are available for discussions.

In the seminar, the content taught in the lecture is further deepened through interactive formats such as workshops, discussions, student presentations and group mentoring, as well as a multi-day field trip to the current case study.

Participants\* in the module each choose a topic/object from the course content at the beginning of the semester. The possible focal points are related to the case study of the current semester. These are assigned to one of the overarching themes of the city, such as material flows, mobility, neighborhoods, or buildings.

During the semester, the chosen topic/object is intensively studied by the students, visited on site if necessary, and presented. The development takes place in small groups of 2-3 students each. In addition, individual contents and methods are further deepened in accompanying workshops. The intermediate presentations, in the course of the development of the essay, serve as practice.

The students actively participate in the excursion components and develop their own concepts and strategies.

Towards the end of the semester, the result is submitted as a written paper (essay of 5-7 pages plus graphics, images, appendices, etc.).

It is then presented in the form of a short lecture and discussed together. As a rule, the students present the work of another group.

**Media:**

Slides, lecture notes (to be developed from each semester's lecture focus), posters, presentations. Field trips and site visits to the properties discussed in the case studies with supporting guest lectures and on-site tours.

**Reading List:**

Friedman, T. L. (2009). Hot, flat, and crowded: Why we need a green revolution--and how it can renew America

(Release 2.0, updated and expanded ; 1st Picador ed.). New York: Picador/Farrar, Straus and Giroux.

Heck, H.-D., & Meadows, D. L. (1972). Dennis Meadows [u.a.] Die Grenzen des Wachstums (The limits to growth, dt.).

McDonough, W., & Braungart, M. (2002). Cradle to cradle: Remaking the way we make things (First edition). New York: North Point Press.

**Responsible for Module:**

Prof. Dr.-Ing. Werner Lang sekretariat.enpb.bgu@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Nachhaltige Quartiers-, Stadt- und Infrastrukturentwicklungen (Vorlesung, 2 SWS)

Lang W [L], Denk A, Lang W, Schwering K

Fallstudien nachhaltiger Quartiers-, Stadt- und Infrastrukturentwicklungen (Seminar, 2 SWS)

Lang W [L], Denk A, Lang W, Schwering K, Stark da Silva P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2716: Forest Growth and Forest Operations | Forest Growth and Forest Operations

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning success of the module Forest Growth and Forest Operations will be assessed by a written examination of 90 minutes. This is due to the fact that biometric topics, growth processes and analyses as well as the forest growth modelling part of the lecture can be presented best in a written form by drawings, figures, calculation schemes, etc. For example the description of biological processes and growth cycles in forest growth simulators can best be explained and depicted by graphical representations.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in biology and forest science.

#### Content:

The part Forest Growth deals with objectives and methods of forest growth and yield science. First, as fundamental topic, principal factors of the organic production of forest stands based on the driving forces (climate, water, nutrients) are shown and explained. In a next step growth and yield is analyzed more closely as part of the total production of plant communities. This leads to principles of tree shape development, tree growth and carbon dynamics in general. From individual tree growth the course proceeds to structure and development of whole forest stands. Both previous subjects provide the basic knowledge for understanding the effect of silvicultural treatment on quantitatively measured growth and yield characteristics. Growth trends, productivity and carbon dynamics of the main tree species in Central Europe are presented. Analyses of stand structure, growth and yield in the view of climate change are discussed. Different types of forest growth models on tree, stand and forest enterprise levels are introduced. The part Forest Operations can be divided in 5 topics: (1) Overview of mechanized harvesting (methods and

most common systems), (2) Environmentally sound resource road planning and construction, (3) Assessing the environmental impacts of forest operations on forest stands and soils, (4) Means of eco-efficient wood transportation from the forest to the mill and (5) Current developments in small-scale forest operations.

**Intended Learning Outcomes:**

On successful completion of the module, students are able to

- Understand the environmental factors influencing the forest stand production
- Describe the effects of silvicultural treatment on quantitatively measured growth and yield characteristics
- Understand the principles of growth models
- Analyze and evaluate the impact of environmental changes on tree and stand growth
- Create possible silvicultural measures to mitigate negative effects of environmental changes on forest stand growth
- Understand and evaluate the impact of biotic and abiotic factors on growth, vitality and stability of individual trees and forest stands
- Understand the fundamentals of sound resource road planning and construction
- Describe the links between mechanized harvesting and potential stand and soil damages
- Evaluate the productivity and carbon footprint of different harvesting systems.

**Teaching and Learning Methods:**

Lectures and presentations, field trip (optional).

**Media:**

Lectures and presentations (pdfs).

**Reading List:**

FOREST GROWTH: Pretzsch, H., (2009): Forest Dynamics, Growth and Yield. Springer Verlag, Berlin, 664 S. 2009 published as Hardcover (ISBN 978-3-540-88306-7) 2010 published as paperback (ISBN 978-3-642-14861-3) FOREST OPERATIONS: Bowers, S. 2012. Designing woodland roads. Oregon State University. EC 1137. 21 pp. Dykstra, D. P. and Heinrich, R. 1996. FAO Model code of forest harvesting practice. 85 pp. Enters, D., Applegate, G.B., Kho, P. C.S., and Man, G. (Eds.) 2002. Applying reduced impact logging to advance sustainable forest management. FAO. Heinrich, R. Recent developments on environmentally friendly forest road construction and wood transportation in mountainous forests. Rummer, B. 2009. New technology in forest operations. www.forestlandowners.com. 3 pp. Sutherland, B.J. 2003. Preventing soil compaction and rutting in the boreal forest of western Canada. FERIC. 53 pp.

**Responsible for Module:**

Rötzer, Thomas; Apl. Prof. Dr. agr. habil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Low Impact Forest Operations (Vorlesung, 1,5 SWS)



Engler B, Bauer E

Low Impact Forest Operations Technology (Exkursion, ,5 SWS)

Engler B, Bauer E

Forest Growth (Vorlesung, 2 SWS)

Pretzsch H, Rötzer T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4098: Forestry Raw Materials and their Utilization | Forestry Raw Materials and their Utilization

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning success will be assessed by a written examination (duration 60 min) where students are expected to demonstrate the level of knowledge and their ability to use and apply it in solution finding strategies. Additionally a midterm Assignment (voluntarily), the students have to prepare and give a structured oral presentation in a seminar organized at the end of the summer term. The topic of the presentation is defined in agreement with the lecturer. The presentation may be prepared either individually or in groups of two. The midterm presentation Assignment allows to improve the examination mark by 0.3.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basics of biology, chemistry, physics and sciences to deal with the biological production, and the processing and conversion processes of wood to final products, and the environmental assessment.

#### Content:

1. Overview and global potential of forest resources;
2. Availability, characteristics and properties of forest based products (wood and non-timber forest products);
3. Technologies and processes from raw materials to final products: sawn timber, wood-based products, pulp and paper;
4. Criteria and rules of a resource efficient application;
5. Environmental assessment of forestry raw materials and products.

### **Intended Learning Outcomes:**

Upon successful completion of the module students are able to:

- illustrate the multidisciplinary of forests and their products;
- propose options to maximize the value chains of forest based products;
- exemplify production and process technologies and typical sector industries;
- demonstrate the role, potential and limitations of forestry raw materials in the framework of sustainable development;
- outline economical, environmental and social aspects of typical products and applications;
- develop strategies to strengthen the value and impact of typical forestry raw materials and non-timber forest products.

### **Teaching and Learning Methods:**

Lecture, exercises, seminar, Optional: visits to laboratories and industry.

### **Media:**

Demonstration material: raw materials and products; PP presentations; videos.

### **Reading List:**

Fengel, D.; Wegener, G. (2003): Wood - Chemistry, Ultrastructure, Reactions. Kessel Publishers  
Dinwoodie, J.M. (2000): Timber: Its nature and behaviour. Van Nostrand Reinhold Publishers  
Forest Products Laboratory (ed) (2010): Wood as an Engineering Material: <http://www.fpl.fs.fed.us-documents-FPLGTR-fplgtr.113-PL113.htm>.  
Rowell R. ed. (2012): Handbook of Wood Chemistry and Wood Composites. Sec. Edition, CRC Press Taylor & Francis Group, 703 pp.  
Shmulsky, R., Jones P.D (2011): Forest Products & Wood Science, 6th ed. Wiley-Blackwell, Chichester UK

### **Responsible for Module:**

Prof. Dr. Klaus Richter – Lehrstuhl für Holzwissenschaft Winzererstr. 45, 80797 München, Tel.: 089/ 2180 - 6421, [richter@hfm.tum.de](mailto:richter@hfm.tum.de)

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Forestry Raw Materials and their Utilization (Übung, 2 SWS)

Richter K, Sanchez-Ferrer A, Khaloian Sarnaghi A

Forestry Raw Materials and their Utilization (Vorlesung, 2 SWS)

Richter K, Sanchez-Ferrer A, Khaloian Sarnaghi A, van de Kuilen J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4161: Forest Management | Forest Management

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module integrates different scientific and management methods with the objective to develop concepts for the sustainable management of forest. Forest managers must understand complex content and be able to explain it to a critical audience. The learning outcome will be assessed by an oral exam (30 minutes) covering the whole outcomes of the module.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None.

#### Content:

1. Definition of forest and forest ecosystem
2. Overview of forestry on global, regional and local scales
3. Introduction into objectives and methods of forest ecosystem management and forest management planning
4. Demonstration of forest decision support systems and multiple-objective optimization
5. Overview of silvicultural techniques
6. Basic Knowledge of Forest economics
7. Demonstration of examples in lowland and mountain forest management.

#### Intended Learning Outcomes:

At the end of the module the students are able to:

- understand different concepts of forest management
- understand different demands in forest management
- apply means of linear programming to harmonize different measures
- apply decision support systems
- evaluate different forest management measures.

**Teaching and Learning Methods:**

The module is separated into lectures and exercises. Lectures providing the theoretical foundations and concepts in Forest Management.

Exercises are done in supervised groups in the field.

**Media:**

PowerPoint presentations, additional reading material, software application.

**Reading List:**

FAO (2018): State of the World's Forests; FAO (2016): Global Forest Resources Assessment 2015.

**Responsible for Module:**

Felbermeier, Bernhard; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Forest Ecosystem Management (Vorlesung, 2 SWS)

Felbermeier B [L], Annighöfer P, Felbermeier B

Forest Management Planning (Übung, 3,5 SWS)

Knoke T, Bödeker K, Döllerer M, Holzer D, Pintado K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4189: Fisheries and Aquatic Conservation | Fisheries and Aquatic Conservation

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a 60 min. written exam (Klausur). In addition, the students need to prepare a 10-15 min. presentation in the practical exercise. Gradings from the examination and the presentation are weighed in the ratio 2:1. The examination means to measure the student's ability to assess anthropogenic influence on aquatic ecosystem functioning, evaluate the socioeconomic importance of fisheries and aquaculture, explain factors affecting susceptibility to and recovery from overexploitation, create and apply sustainable aquatic conservation tools and recall fisheries management tools for wild populations as well as of the underlying biological principles such as fish population dynamics. In the written examination students demonstrate by answering questions under time pressure and without helping material their theoretical and practical (e.g. application of methods) knowledge about fisheries management. For answering the questions, the students require their own wording. In the practical exercise the students prepare a presentation in form of a brochure, poster, video or podcast. For the presentation, the student is expected to demonstrate that he or she is capable of preparing a certain topic within a given time frame in such a way as to present or report it in a clear and comprehensible manner to specific target audiences in the context of fisheries and aquatic conservation.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Interest in aquatic biology, social sciences, conservation biology and management; this course can be selected independently from other courses in the fields of Fish Biology and Limnology at TUM

#### Content:

The module combines the theoretical background and the practical implementation of fisheries management and aquatic conservation. The key aspects are:

1. Introduction to fish, shellfish and fisheries management,
2. The socioeconomic importance of fisheries and aquaculture,
3. The functioning of aquatic ecosystems and the impacts of fisheries on aquatic ecosystem health,
4. Factors affecting susceptibility to and recovery from overexploitation,
5. Fisheries Management Tools for wild populations,
6. Aquaculture,
7. Aquatic Biodiversity Conservation,
8. Case study and knowledge transfer/communication exercise

### **Intended Learning Outcomes:**

At the end of the module students understand the importance of aquatic resources for mankind and the variables which influence ecosystem functions as well as the principles of aquatic biodiversity conservation. They are able to analyze the effects of natural and man-made disturbances in aquatic ecosystems (e.g. overexploitation) based upon an interdisciplinary understanding of methodological aquatic and fisheries biology, human dimensions, socioeconomic factors and management skills. In addition, students are able to objectively integrate knowledge from different disciplines (e.g. fish biology, conservation biology, commercial fishing techniques, aquatic habitat assessment and management) to evaluate sustainable resource management.

### **Teaching and Learning Methods:**

The module combines a lecture "Fisheries Management" with an accompanying practical exercise "Applied Aquatic Conservation". The lecture contents will be presented using lectures based on power-point presentation, group work and interactive role plays in order to combine The module combines a lecture "Fisheries Management" with an accompanying practical exercise "Applied Aquatic Conservation". The lecture contents will be presented using lectures based on power-point presentation, group work and interactive role plays in order to combine activating teaching methods with classic presentation techniques. In the accompanying practical exercise to the lecture the students will apply the gained theoretical knowledge by conducting case studies or participating research experiments with various content in the field of freshwater ecology and aquatic conservation. The content of the practical work is incorporated into running research projects at the chair (e.g. habitat restoration, artificial breeding programs, habitat assessment, conservation genetics). Additionally, the students learn to independently screen the respective literature in this field and learn methods in science communication.

### **Media:**

Form of presentation: lecture, case study, movie segment and practical exercise  
material: lecture notes, flip-chart/board, plus different materials for methodological/technical training

### **Reading List:**

1. King (2007) Fisheries Biology, Assessment and Management
2. Helfman (2007) Fish Conservation: A guide to understanding and restoring global aquatic biodiversity and fishery

resources

3. Moyle & Cech (2004) Fishes An introduction to Ichthyology
4. Primack (2008) A primer of conservation biology

**Responsible for Module:**

Geist, Jürgen; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Fisheries Management (Vorlesung, 2 SWS)

Geist J

Applied Aquatic Conservation (Übung, 2 SWS)

Geist J [L], Pander J, Zingraff-Hamed A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### IN2124: Basic Mathematical Methods for Imaging and Visualization | Basic Mathematical Methods for Imaging and Visualization

Version of module description: Gültig ab winterterm 2011/12

<b>Module Level:</b> Bachelor/Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Type of Assessment: written exam.

The exam takes the form of a 75-minute written test, in which the students, based on the questions posed, are intended to demonstrate their knowledge of the basic mathematical methods as well as their ability to apply those methods successfully when solving basic abstract mathematical problems. In addition, by answering questions about concrete applications in image processing and computer vision, the students are expected to show that they can formulate applied problems mathematically, that they can analyze their mathematical properties, and that they can solve them using suitable methods.

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

IN0015 Discrete Structures, IN0018 Discrete Probability Theory, IN0019 Numerical Programming, MA0901 Linear Algebra for Informatics, MA0902 Analysis for Informatics

#### Content:

Basic and most commonly applied techniques will be presented in the lectures and demonstrated in example applications from Image Processing and Computer Vision. The same mathematical methods are also applied in other engineering disciplines such as artificial intelligence, machine learning, computer graphics, robotics etc.

The module IN2124 is covering topics such as:

- Linear Algebra

++ linear spaces and bases

- ++ linear mappings and matrices
- ++ linear equation systems, solving linear equation systems
- ++ least squares problems
- ++ eigen value problems and singular value decomposition
- Analysis
- ++ metric spaces and topology
- ++ convergence, compactness
- ++ continuity and differentiability in multiple dimension, Taylor expansion
- Optimization
- ++ existence and uniqueness of minimizers, identification of minimizers
- ++ gradient descent, conjugate gradient
- ++ Newton method, fixed point iteration
- Probability theory
- ++ probability spaces, random variables
- ++ expectation and conditional expectation
- ++ estimators, expectation maximization method

In the exercises the participants have the opportunity to gain deeper understanding and to collect practical experience while implementing or applying the methods in order to solve real problems, .

### **Intended Learning Outcomes:**

Upon successful completion of the module, participants understand the basic mathematical techniques and methods. They are then able to formulate real problems in the field of imaging and visualization mathematically, and to select methods for solving the problem, to optimize them and to evaluate them. They will also be able to apply these techniques and methods to other engineering disciplines such as artificial intelligence, machine learning, computer graphics, robotics etc.

### **Teaching and Learning Methods:**

The module consists of lectures and tutorial sessions. The content of the lectures is conveyed in presentations of scientific material via slides and blackboard. By solving homework assignments, the students are encouraged to work intensively on the respective topics and their applications. The solutions of the assignments are discussed in the tutorial sessions.

### **Media:**

slide presentation, blackboard

### **Reading List:**

MATLAB

- Cleve Moler, first chapter of Numerical Computing with MATLAB, SIAM Linear Algebra
- Yousef Saad, Iterative Methods for Sparse Linear Systems, SIAM
- Lloyd N. Trefethen and David Bau, Numerical Linear Algebra, SIAM
- Gilbert Strang, Introduction to Linear Algebra, Wellesley-Cambridge Press Analysis
- Walter Rudin, Real and Complex Analysis, McGraw-Hill Optimization

- Ake Björck, Numerical Methods for Least Squares Problems, SIAM
- Jonathan Shewchuk, An Introduction to the Conjugate Gradient Method Without the Agonizing Pain
- Uri Ascher, A first course in numerical methods, SIAM Probability Theory
- Heinz Bauer, Measure and Integration Theory, deGruyter
- Sheldon Ross, Introduction to probability and statistics for engineers and scientists, Elsevier
- PDEs
- Lloyd Nick Trefethen , Finite Difference and Spectral Methods for Ordinary and Partial Differential Equations
- Cleve Moler, chapter 11 of Numerical Computing with MATLAB, SIAM

**Responsible for Module:**

Navab, Nassir; Prof. Ph.D.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Grundlegende Mathematische Methoden für Imaging und Visualisierung (IN2124) (Vorlesung mit integrierten Übungen, 4 SWS)

Lasser T [L], Lasser T ( Cheslerean-Boghiu T, Pekel E )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2717: Genetic Resources Management and Forest Protection | Genetic Resources Management and Forest Protection

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning outcome will be assessed by a written exam (duration 60 min) where the student have to analyze the risk of given pest and abiotic hazard-scenarios and to develop adequate disturbance management strategies. Furthermore, they have to analyze a genetic diversity study from a plant, animal or fungus species and develop a long-term genetic management strategy. In this way, the students can demonstrate that they have obtained the ability to use their knowledge in real world management situations.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in biology and forest science

#### Content:

PPart I Genetic Resources Management – Schaefer/Benz

1. Introduction: DNA, genetic code, genes, alleles, genomes, speciation
2. Basics of Population Genetics
3. Genetic variation in forest ecosystems
4. Tree breeding
5. Genetic conservation & sampling strategies
6. GRM in mountain ecosystems
7. GRM in the Tropics
8. GRM in the dry zones
9. Sustainable management strategies
10. Fungi – The Good, the Bad, and the Ugly
11. The genetic treasure trove of fungi

## Part II Disturbance ecology & management– Seidl/Seibold

1. Disturbance ecology 101 (R. Seidl)
2. The role of disturbances in forest ecosystem dynamics (R. Seidl)
3. Forest protection strategies in the course of time (S. Seibold)
4. Wind (R. Seidl)
5. Snow and ice (R. Seidl)
6. Fire (R. Seidl)
7. Drought (R. Seidl)
8. Functional roles of insects in forest ecosystems (S. Seibold)
9. Bark beetles – ecology (S. Seibold)
10. Bark beetles – management and impacts (S. Seibold)
11. Defoliators (S. Seibold)
12. Aphids, adelgids and others (S. Seibold)
13. Deadwood-inhabiting insects (S. Seibold)
14. Principles of disturbance management (R. Seidl)

### **Intended Learning Outcomes:**

On successful completion of the module, students are able to

- assess genetic diversity patterns in natural populations of different groups of organisms (mammals, birds, plants, fungi)
- understand the importance of maximizing genetic diversity
- understand the impact of biotic and abiotic factors on vitality and stability of individual trees and forests;
- understand the impact of fungal pathogens and insects on trees;
- apply their ecological knowledge to minimize and forecast the risk of damages by fungal pathogens;
- U explain the most important abiotic and biotic causes of tree death in forest ecosystems
- characterize forest disturbance regimes
- understand the different roles that disturbances play in forest ecosystems
- explain how plants adapt to different disturbance agents
- develop different disturbance management strategies.

### **Teaching and Learning Methods:**

Lectures and presentations: provide the theoretical population genetics and ecological background to understand the role of genetic diversity in general and the role of disturbance at population level and beyond.

Group work: will be used to learn how to assess and interpret genetic diversity patterns in various real world examples and to practice risk forecasting in disturbance management or develop disturbance management strategies.

Field trip (optional): to help understand the role of disturbance and genetic diversity in a real Bavarian forest setting.

**Media:**

lectures and presentations (pdfs)

**Reading List:**

Frankham, et al. 2017, Genetic Management of Fragmented Animal and Plant Populations, Oxford University Press; Allendorf et al. 2013, Conservation and the Genetics of Populations, Wiley-Blackwell; Agrios, G.N. 2005, Plant Pathology, 5th edition. Elsevier Academic Press, Oxford; Speight, M.R. & Wylie, F.R., 2001: Insect pests in tropical forestry. CABI publishing; Ruppert, E.E. & Barnes, R.D., 1993: Invertebrate Zoology 6th edition (Chapter 16 insects; p 825-862)

**Responsible for Module:**

Schäfer, Hanno; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Genetic Resource Management (Vorlesung, 2 SWS)

Benz J, Schäfer H

Disturbance ecology and management (Vorlesung, 2 SWS)

Seidl R [L], Seidl R, Seibold S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1545: Human Resource Management in Agriculture and Related Industries | Human Resource Management in Agriculture and Related Industries

Version of module description: Gültig ab winterterm 2018/19

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

During the written exam (90 min.) students demonstrate their ability to understand human resource management practices, to select and adapt techniques suitable to specific contexts in agriculture and life science industries, to compare and contrast techniques and practices, to evaluate and change selected practices in case applications. Example practices cover the fields of planning the workforce, recruiting, selecting, and training employees, as well as providing feedback to, and evaluating employees, as well as discipline and dismissal, compensation, incentive plans, benefits and services, and workplace diversity. Students analyze exam questions and write up answers in their own words.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

BS Degree. Prior knowledge of basic ideas of economics and management is required; knowledge in strategic management is recommended.

#### Content:

The course is designed to provide master level students with an understanding of pertinent human resource management practices and how to adapt practices from other industries to farms, horticultural and landscaping operations, in agribusinesses, in the food industry, and in related businesses. Practices relate to planning the workforce, recruiting, selecting, and training employees, as well as providing feedback to, and evaluating employees. Additional practices relate to discipline and dismissal, compensation, incentive plans, benefits and services, and workplace diversity. Examples of current issues as well as laws and regulations provide context for different human resource management practices.

**Intended Learning Outcomes:**

After successfully completing the module, students are able to accomplish the following:

- understand human resource management practices and their objectives;
- evaluate human resource management practices in use;
- develop and adapt appropriate human resource management practices for specific organizations in agriculture and the life science industries.
- determine the fit of different human resource management practices with different organizational goals and environments.

**Teaching and Learning Methods:**

Lectures serve to introduce human resource management practices and their objectives.

Video clips serve to illuminate HRM practices and as a basis of discussion of practices. Case descriptions and task sheets are analyzed in small groups and discussed in class to empower students to apply human resource management practices in specific constellations.

**Media:**

Presentation software, case descriptions and task sheets, discussion facilitation support media, video clips

**Reading List:**

Dessler, G. (latest edition). Human resource management, Prentice Hall: Upper Saddle River/NJ.

**Responsible for Module:**

Bitsch, Vera; Prof. Dr. Dr. h.c.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Human Resource Management in Agriculture and Related Industries (WZ1545) (Seminar, 4 SWS)

Bitsch V [L], Bitsch V, Huhn-Kücükakyüz C, Köksal S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ2731: Hydrometeorology and Management of Water Resources | Hydrometeorology and Management of Water Resources

Version of module description: Gültig ab summerterm 2022

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning outcome will be assessed by an oral examination (30 min) in which students should demonstrate their profound understanding of water management and ability to analyze and evaluate key issues and challenges. They should exhibit the capability of identifying and solving problems in a concise way and show that they can express themselves in a clear and scientific manner. A voluntary mid-term assignment (presentation) in the seminar assesses the students' ability to communicate and present an integrated management study case in one selected topic in sustainable water management. It will serve for grade improvement by 0.3 according to §6(5) APSO.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in chemistry and physics.

#### Content:

1. Hydrometeorology (including hydrological cycles, precipitation-, run off-, evapotranspiration - process of formation, measurement, global and regional spatial and temporal patterns, influences by land use land cover change, climate change scientific basis, climate change impacts, adaptation, vulnerability in water resources).
2. Problems in water management according to too little water, too much or too dirty. Different aspects of water augmentation (e.g. harvesting, desalination, translocation), water conservation (irrigation, pricing, household, ...), water management processes (e.g. IWRM, virtual water) are discussed by practical examples;

**Intended Learning Outcomes:**

Upon the successful completion of this module the students are able to understand the basics of hydrology, and the influence of climate change on hydrological processes and management. They are able to analyze and classify various problems in water resource management and to assess the suitability and applicability of different management practices in the field of water augmentation (e.g. rain water harvesting, fog nets, dams) and water saving strategies (e.g. in irrigation, sanitation) to integratively solve water-resource-problems.

**Teaching and Learning Methods:**

The basics of hydrology and meteorology are presented and discussed in a lecture with thorough explanations. Some simple case studies are used to introduce into the theoretical background (e.g. meteorological instruments at the meteorological platform). Student presentations and discussions, group work in the seminar.

**Media:**

PowerPoint presentations; Presentation notes supporting the lecture. Case studies.

**Reading List:**

Ahrends (2000) Meteorology today, 7th edition. Jones JAA (2010) Water Sustainability - A Global Perspective, Hodder Education London. Clarke R & King J (2004) The atlas of water. Figueres C. et al. (2003) Rethinking water management. Wescoat JL et al. (2003) Water for life, water management and environmental policy. Grambow M (2008) Wassermanagement.

**Responsible for Module:**

Prof. Dr. Annette Menzel - Professur für Ökoklimatologie Hans-Carl-von-Carlowitz-Platz 2, 85354 Freising, 08161/ 71-4740, amenzel@wzw.tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Management of Water Resources (Vorlesung, 2 SWS)  
Estrella N, Menzel A

Introduction to Hydrometeorology (Vorlesung, 2 SWS)  
Menzel A [L], Menzel A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### EI70860: Integration of Renewable Energies | Integration of Renewable Energies [IRE]

Version of module description: Gültig ab summerterm 2020

<b>Module Level:</b> Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module exam consists of a written exam (60 min). The goal of the exam is to test with questions if the students are able to reproduce general challenges regarding the integration of renewable energies. With calculations on simple examples the capability of working with this general knowledge on specific questions is tested. The exam will be graded.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Fundamental knowledge in:

- renewable energy technologies (hydro, wind, photovoltaic, biomass, geothermal)
- power generation and transportation in large quantities in future energy supply scenarios
- fossil and renewable energy carriers
- regulation frameworks in electricity markets
- political and social aspects in energy systems

#### Content:

The lecture is subdivided in an introduction and three main chapters (physical, system and market integration), which classify the different challenges of the integration of renewable energies in an existing electricity system:

The introduction discusses the characteristics of fluctuating power generation from renewable energies and derives the resulting challenges for the system.

Physical integration discusses (technical) options, which enable an adaption of the generation side and the demand side (grid, storage, demand side integration, etc.).

System integration evaluates the possible contribution of renewable energies to provide ancillary services (balancing power, reactive power, inertia, etc.).

Market integration explain the influence of an increasing share of renewables on the existing market participants and discusses alternative framework design options.

**Intended Learning Outcomes:**

Upon successful completion of the module, students are able to:

- describe the challenges of a power system with a high share of renewable energies
- understand the properties of renewable energies from a system perspective
- analyze possible options to improve the integration of the renewable energies
- understand the system behavior of renewable energies
- analyze the influence of renewable power generation on operation of the conventional power plant park
- assess renewable power generation in relation to electricity markets and the demand of balancing power

**Teaching and Learning Methods:**

Lecture: beamer and partly blackboard presentations with teacher centered teaching

Tutorials: Calculations (by hand or PC based) as well as reading assignments which are both discussed in lessons

Language of instruction, English in Winter Semester and German in Summer Semester.

**Media:**

Lecture and exercise with beamer and blackboard. Presentations and exercise will be presented online.

**Reading List:**

Lawrence E. Jones, Renewable Energy Integration, 2017

IEA: The Power of Transformation, 2014

**Responsible for Module:**

Hamacher, Thomas; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Integration of Renewable Energies (Vorlesung mit integrierten Übungen, 4 SWS)

Kuhn P, Gawlick J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### **EI7467: Interdisciplinary Project Internship Concept Development of a Renewable Energy System in a Developing Country | Interdisciplinary Project Internship Concept Development of a Renewable Energy System in a Developing Country [ProRESDC]**

*Interdisciplinary Student Project Concept Development of a Renewable Energy System in a Developing Country*

Version of module description: Gültig ab winterterm 2016/17

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 135	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### **Description of Examination Method:**

The students' learning success will be determined by the following components of the project:

1. Input throughout the course of the milestone meetings (the supervisor of a team will rate each member of his team individually based on her or his input during the milestone meetings):

- Integration of the extraneous inputs, which his team members from other fields of study give, in order to develop a holistic concept for a renewable energy system in a developing country
- Analyzing the framework conditions, determining obstacles and deriving innovative solutions for renewable energy systems in developing countries before each milestone meeting
- Communication with the team leader and the other team members
- Meeting the timetable

2. Final presentation:

A jury will evaluate, how far the team manages to transfer their developed concept into an understandable context and to convince the audience of their choice of a certain concept. This includes the logic of the presentation, the focus on relevant points and appealing visualizations of their presentation slides.

In addition to this, each team member is individually evaluated for her or his presentation methods and expertise shown during the subsequent questions.

3. Project report (identical evaluation of all team members):

Here is rated how much convincing the decision was explained for the chosen energy concept and against other possible concepts due to the technological, financial and socio-cultural conditions and how comprehensible the implementation of the final concept was described.

**Repeat Examination:**

Next semester

**(Recommended) Prerequisites:**

- Bachelor degree in a technical field of studies or in TUM-BWL
- Participation in "Series of lectures Renewable Energy Systems in Developing Countries"
- Interest in energy systems and their application / realization in developing countries
- Interest in the conversion of knowledge, which may differ from the field of her or his own studies on the one hand , but on the other hand is essential for the holistic understanding of their own study curriculum
- Interest in team-based project work and developing a realizeable concept
- Letter of motivation regarding study program, expertise, motivation and relevant experience (1.000 - 2.000 characters)

**Content:**

During the study project students develop a concept for the renewable energy system of a given location in a developing country.

During this concept development the variety of possible energy concepts will be reduced by general characteristics of stand-alone systems in the first step, followed by technological criteria in developing countries and socio-cultural impacts. Subsequently, the suitability of the various power production technologies, which are presented in the lectures, will be evaluated for the site in the developing country. Afterwards financing possibilities and framework conditions of regional market will be taken into account for the selection of the energy concept. In the end the final energy concept will be derived out of these sub steps.

Additionally the students derive options based on their developed energy concept, how to empower the population of the region economically by means of renewable energies.

**Intended Learning Outcomes:**

After participating in the project the students will be able to:

- understand extraneous knowledge concerning renewable energy systems in developing countries by the interdisciplinary collaboration with students from different study fields
- implement this interdisciplinary knowledge about energy systems in developing countries into action competences
- present the progress of a project target-oriented in meetings
- highlight the relevant technological, financial and sociocultural framework conditions of a planned energy system for a certain location in a developing country
- evaluate various options of energy supply concepts with based on their framework conditions
- manage the progress of a concept
- develop a suitable energy concept based on the requirements and possibilities of a defined location

- present convincingly their concept in a final presentation
- describe convincingly in a project report both the choice of their energy concept taking the involvement of all relevant aspects into account and the its realization

### **Teaching and Learning Methods:**

Students are expected to achieve the learning outcomes by means of a project internship. Interdisciplinary teams of students, consisting of students from various faculties, develop a concept for a renewable energy system for a particular location in a developing country in defined milestones. Each team is advised by a scientific assistant, who is their team leader. This advisor is managing the technical expertise of the team members with her or his project experience during the weekly milestone meetings.

Finally, each team presents its energy concept in a final presentation and in a project report. As a closing event there is offered a two-day excursion to an alpine mountain hut in Tyrol. Here both the the pros and cons of the concepts developed by the students are discussed to give the students the opportunity to reflect on their own work and that of their fellow students. Also the island energy system of the alpine hut, consisting of PV, biomass and battery storage, is shown in order to experience a realization of such a low-budget energy system.

### **Media:**

- Practical presentation of components using PowerPoint slides and scripts for the subsequent experiments (practical events)
- PowerPoint slides to define the milestones (milestone meetings)
- Final presentation using PowerPoint
- Project report using Word or Latex

### **Reading List:**

- Engineers without Borders UK in 2014 - Engineering in Development
- Scripts for each practical event
- Other thematic literature on the recommendation of the speakers of the lecture series

### **Responsible for Module:**

Hamacher, Thomas; Prof. Dr.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Interdisziplinäres Projektpraktikum Konzeptentwicklung eines Erneuerbaren Energiesystems in einem Entwicklungsland (Forschungspraktikum, 4 SWS)

Hamacher T, Cadavid Isaza A, Elyasi S, Pant P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS50000: International Climate Strategies / UNFCCC | International Climate Strategies / UNFCCC

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 90

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

For this module, students will give a presentation (ca. 30 min, 30% of final grade), contribute to a blog (10% of final grade) about the COP conference, and submit a written term paper (ca. 15 pages, 60% of final grade).

The purpose of the presentation is to display students' ability to conduct research independently and to present results in a professional manner, using PowerPoint or an equivalent presentation software. The blog about the COP conference will indicate students' evolving knowledge of and insights into ongoing discussions and relevant topics at the COP. In their term paper, students shall demonstrate their ability to conduct an in-depth analysis of a case study on respective climate strategies and politics and UNFCCC involvement as related to climate change adaptation, mitigation and sustainability challenges. Students have the opportunity to alternatively choose for a nation or group of actors or a thematic topic (such as climate finance or climate justice) for their written paper. They shall establish their analytical competence with regards to current problems and transdisciplinary connections between international climate politics and domestic circumstances, including available environmental resources.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

#### Content:

The module International Climate Strategies / UNFCCC comprises following topics:

- Climate politics as an integrative part of environmental policy
- Evolution of climate negotiations under the UNFCCC and related actors' strategies



- UNFCCC design and processes, also practically experienced as part of an NGO observer delegation to COP negotiations
- Dynamics of international climate negotiations in times of crisis
- Interactions between country delegations and NGO observer delegations
- Climate change mitigation, adaptation, finance and loss & damage
- Climate justice
- National climate change adaptation and mitigation policies and their relation to international climate policy
- National climate policies' embeddedness in and relations to natural environmental resources and resulting sustainability options, such as LULUCF

### **Intended Learning Outcomes:**

After participating in the module, students will be able

- to identify history, key concepts, actors, their strategies, and discourses in the UNFCCC process and related national climate policy debates and be exposed to negotiation theories and tactics
- to apply methods of comparative analysis to climate politics at the national and international levels and test theoretical concepts with empirical research/field study methods
- to have a deeper understanding of different aspects of climate change politics, such as mitigation, adaptation, finance, and loss & damage
- to apprehend the political challenges and opportunities embedded in big transformations, such as the one required to address the current climate crisis
- to identify climate change related national environmental and socioeconomic factors, such as geography, natural resources, impacts and mitigation options, and to develop and understand their relationship to climate strategies of (group of) actors

### **Teaching and Learning Methods:**

The module is comprised of a seminar and an excursion (either in person or online) to a UN Climate Conference (COP). Students will participate in a TUM delegation as NGO observers and attend one of the two weeks of a COP conference. Students who are unable to physically attend the COP conference will be expected to follow the conference online as the conference proceedings are live-streamed.

Two excursions will be offered of one week length each to allow as many students as possible to actively participate, pending the number of eligible places. Note: Excursion costs (flight, accommodation, food) will not be covered by TUM. It is recommended to have international health insurance. Accident insurance is provided in accordance with section VII of the German Social Security Code (SGB VII).

The seminar is divided into two parts – a preparatory pre-excursion and a follow-up post-conference debriefing and analysis. In the preparatory part, the students read relevant introductory literature on the UNFCCC and international climate science and politics. Students will prepare short presentations based on the reading materials, which will serve as the foundation for discussions with the whole group (Guided Reading). In the post-conference period, students will obtain a deeper understanding of the module's topic through general discussion about what was learned regarding the climate negotiations and side events (as observed during the excursion or online) as well as independent/group work on concrete examples. Students will analyse, evaluate

and interlink national climate policies to the natural science of climate change and environmental sustainability as perceived in the different regions / nations or for actor groups. The students will prepare and hold related presentations and actively discuss the international context.

**Media:**

Seminar talks and discussions (both online over ZOOM and in presence), PowerPoint presentations, online blog on COP experiences, TUM Moodle, Earth Negotiations Bulletin (ENB) Newsletter

**Reading List:**

- Guri Bang, Arild Underdal, & Steinar Andresen, eds. The Domestic Politics of Global Climate Change: Key Actors in International Climate Cooperation (Cheltenham, UK 2015).
- Jon Hovi & Tora Skodvin, eds. Climate Governance and the Paris Agreement. Special Issue, Politics and Governance, Open Access Journal, Vol. 4, No. 3 (2016).
- Falkner, R. (2013) Handbook of Global Climate and Environment Policy, Chichester: John Wiley & Sons Inc.
- David Coen, Julia Kreienkamp & Tom Pogram (2020) Global Climate Governance, Cambridge: Cambridge University Press.
- National Communications under the United Nations Framework Convention on Climate Change.
- Repository of UN Documents

**Responsible for Module:**

Menzel, Annette; Prof. Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

International and National Dimensions of Climate Strategies in the Context of UNFCCC (Seminar, 3 SWS)

Menzel A [L], Menzel A

UNFCCC / COP Conference (Exkursion, 3 SWS)

Menzel A [L], Menzel A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2733: Introduction to Soil Science | Introduction to Soil Science

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In a written exam of 60 minutes duration, the students demonstrate by answering questions without helping material their understanding of the nature and properties of soils, and they remember the characteristics of the soils of the field course as well the field assessment methods. In a pass/fail exam (laboratory assignment) in the field of 10 minutes duration, they prove their ability to survey and interpret a soil profile.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in chemistry, physics, and biology.

#### Content:

- What is a soil?
- Mineral (inorganic) soil components
- Soil biology and soil organic matter
- Soil chemistry
- Soil physics
- Soil-forming processes
- Soil survey
- Soil interpretation
- Soil erosion assessment

#### Intended Learning Outcomes:

The students understand the basics of soil science. They can use their knowledge from soil mineralogy, soil organic matter, soil chemistry, and soil physics to understand soil formation

processes and important biochemical and physical properties. The students are able to survey a soil profile and to detect the genesis of the surveyed soil. They can evaluate the possibilities of soil use, the risks to the soil itself and the risks to its environment. They are able to evaluate the hydrology of the soil and to judge the erosion risk.

**Teaching and Learning Methods:**

The lecture discusses the essentials of soil science. The field assessment starts with peer instructions to analyse a soil profile. During the course, the students will do more and more group work to train the evaluation of a soil profile, its hydrology and its erosion risks.

**Media:**

Lecture: presentation notes. Field Assessment: spade, auger, knife, colour charts, TDR probes, suction cups, erosion assessment kits.

**Reading List:**

Brady, Weil: The nature and properties of soils, 14th edition, 2007.

Blume et al.: Scheffer/Schachtschabel Soils Science, 2016.

Eash, Sauer, O'Dell, Odoi, Bratz: Soil science simplified, 6th edition, 2016.

Blum, Schad, Nortcliff: Essentials of Soil Science, 2016.

FAO Guidelines for Soil Description. Prepared by Jahn, Blume, Asio, Spaargaren, Schad, 2006.

**Responsible for Module:**

Schad, Peter; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Introduction to Soil Science: Lecture (Vorlesung, 2 SWS)

Schweizer S

Introduction to Soil Science: Field course (Übung, 3,5 SWS)

Wiesmeier M [L], Wiesmeier M, Garcia Franco N, Völkel J, Putzhammer S, Schad P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4094: Landscape Management - Application Study | Landscape Management - Application Study

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 75	<b>Contact Hours:</b> 75

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment is based on a project work: 1. the participation intensity on discussions and the quality of the contributions during the courses; 2. the demonstrated skills in creating new data layers by combining existing data from official sources (administrations, organizations, etc.) using GIS techniques, in exploring new data and information layers (RS, vegetation ecology), etc. 3. the contribution in developing the project (planning competences); 4. the presentation style, contents and layout; 5. the team work; 6. the project report.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

The successful completion of the modules "Inventory Methods and GIS", "Remote Sensing and Image Processing", "Geographical Information Systems and Vegetation Ecology" and "Landscape Planning" or equivalent skills are required, courses on scientific writing and reporting recommended.

#### Content:

1. Implementation of GIS and RS techniques.
2. Implementation of theoretical concepts of Vegetation Ecology;
3. Implementation of theoretical concepts of Landscape Planning;
4. Oral presentation of findings;
5. Elaboration of a final report.

#### Intended Learning Outcomes:

At the end of the module the students are able to develop or at least to contribute to a landscape management project. More in detail the students are able to:

- work in a team;
- apply the theoretical and practical skills in vegetation ecology, landscape planning, remote sensing and GIS techniques;
- contribute to context-dependant landscape-related planning;
- deliver an oral presentation to communicate their findings;
- prepare a convincing project report using supporting data to back their statements in accordance with guidelines for scientific writing.

**Teaching and Learning Methods:**

Prime characteristic of the Application Study is the self-organized group work by the students to reach the defined objective of the project assignment. Progress of the team is supported by group discussions, theory input and coaching provided by lecturers on demand.

**Media:**

Scripts and reports of the above listed lectures and exercises offered within the elective field; basic data sets to develop the application study (GIS, RS, etc.); additional information on request and up on necessity (project driven).

**Reading List:**

The literature recommended within the Modules "Inventory Methods and GIS", "Remote Sensing and Image Processing", "Geographical Information Systems and Vegetation Ecology" and "Landscape Planning" should be used.

**Responsible for Module:**

Döllerer, Martin; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Landscape Management - Application Study (Vorlesung mit integrierten Übungen, 5 SWS)

Augenstein I, Döllerer M, Mengesha M, Teixeira Pinto L

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS10013: Modelling and Statistical Analysis of Large Arrays | Modelling and Statistical Analysis of Large Arrays [MASALA]

*Evaluating climate projections, remote sensing data, and vegetation model output*

Version of module description: Gültig ab winterterm 2023/24

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment type is a graded learning portfolio (100%), typically comprising 12 solutions (each approx. 1-2 pages) of exercises posed during the presence phase. In the portfolio students' record their individual learning progress and reflect their way of conduct and applied methods. Thus, the portfolio documents students' understanding and perception of module contents as well as their self-dependent approach during the self-learning phase, allowing for directly assessing whether the learning outcomes have been reached. Optionally, students may provide an oral presentation (10 min) of one portfolio entry as a mid-term assessment in accordance with APSO §6 Abs. 5 which may allow for a 0.3 improvement in the module degree in case the overall examination would have been passed regardless of the 0.3 improvement. There is no re-examination option for the mid-term assessment. In case the overall module examination is re-taken, a successful mid-term assessment will be accounted for.

For the grading, each of the typically 12 provided solutions is rated individually with a maximum of 10 points per solution. For the final grading, the points of individual solutions are added up and set in relation to the maximum number of achievable points (typically 120).

#### Repeat Examination:

Next semester / End of Semester

#### (Recommended) Prerequisites:

Fundamentals of programming (e.g. R, Python)

Fundamentals of climatology, remote sensing, and ecophysiology

Modules taken previously which are required for participation:

Modules taken previously which are helpful for participation:

Climate Change – The complete briefing

Introduction to ecological modelling

Modelling and simulation of ecological systems  
Environmental Monitoring and Ecological Data analysis

**Content:**

Tackled contents comprise:

1. Specifics of a programming language (e.g. R, Python)
2. Efficient programming syntax in context of dealing with raster-based data
3. Statistical evaluation of climate data and projections, and their effects (e.g. CRU, CMIP)
4. Preprocessing of remote-sensing data (e.g. MODIS, Sentinel)
5. Evaluation and interpretation of simulation results from a dynamic vegetation model
6. Visualization of raster-based data (e.g. maps, histograms, scatterplots)
7. Quantification of statistical and causal relationships among land-surface processes
8. Interpretation of results from analyses
9. Critical reflection/falsification of deployed statistical methods
10. Documentation of learning progress within a learning portfolio (e.g. in R)
11. Presentation and discussion of methods and learning outcomes

**Intended Learning Outcomes:**

Upon successful completion of the module, students are able to process large, raster-based data related to climatology, climate- and land-surface models, and remote sensing by means of a programming language (e.g. 'R' or Python). Using basic statistical means, students are able to analyze large data-sets and correctly interpret derived results. They are able to display the results in plots, diagrams, and tables. Moreover, students have developed a profound understanding of key land-surface processes as well as dynamic vegetation- and land-surface models. Students are able to document their methodological approach and results in a report. Furthermore, students are able to present their learning progress and analyses results in a short presentation. They are able to critically evaluate the short presentations of their class mates. The students are able to self-dependently and efficiently develop solutions for newly posed questions in context of evaluating raster-based data. They are able to independently find solutions for the work steps.

**Teaching and Learning Methods:**

The module consists of an exercise. The exercise consists of a synchronous in-presence phase (4 SWS) and an asynchronous self-learning phase (6 h per week). During the presence phase, new programming routines for the efficient evaluation of raster-based data are taught and related exercises are posed. These exercises are independently solved by students during the self-learning phase and documented in an individual learning portfolio. Per teaching unit individual learning portfolios are presented and discussed. For this purpose, teaching portfolios are sent to the lecturers prior to a teaching unit, allowing for preparation of the evaluation and discussion in class. At the beginning of each teaching unit, selected participants briefly present their most recent portfolio entry which is then discussed in plenum. Constructive suggestions for improvement posed by the class-mates and lecturers point out potentials for improvement for the methodological approach and/or the documentation in the portfolio. At the end of the semester, all students have produced their individual learning portfolio, in which the programming routines, the interpretation of achieved results, and the individual learning progress are recorded. On the one hand, the portfolios



provide the lecturers detailed insights into the learning progress of the students as well as their individual understanding of contents tackled, allowing for judging whether the learning outcomes have been achieved. On the other hand, the portfolios eventually provide the students with a detailed documentation of the exercise, which may serve as a guideline for future programming exercises (e.g. in context of the M.Sc.-thesis).

**Media:**

To convey the theoretical fundamentals and discuss the individual learning achievements of the students, power-point presentations will be deployed. The required programming skills interactive exercises using PCs and laptops will be exemplified 'hands on' using case studies. Those skills are then elaborated by self-dependently solving posed exercises during the independent self-learning phase.

**Reading List:**

Fundamentals of plant ecophysiology: Lambers and Oliveira, 2019: Plant Physiological Ecology.  
Fundamentals of remote sensing: Lillesand et al., 2014: Remote Sensing and Image Interpretation.  
Fundamentals of ,R': Crawley, 2014: Statistics: an introduction using R.  
Fundamentals of climate- and land-surface modelling: F. Stuart ChapinIII, Pamela A. Matson, Peter M. Vitousek, 2011: Principles of Terrestrial Ecosystem Ecology

**Responsible for Module:**

Rammig, Anja, Prof. Dr. rer. nat. anja.rammig@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Modelling And Statistical Analysis of Large Arrays (Übung, 4 SWS)

Rammig A [L], Buras A, Rammig A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2722: Mountain Catchments under Changing Climate | Mountain Catchments under Changing Climate

Version of module description: Gültig ab Sommerterm 2022

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In a written exam, students demonstrate that they have gained an understanding of hydrological processes and that they are able to apply and run a hydrological model for a mountain catchment. By an 10min oral presentation and a 5min discussion via Live-Stream (ZOOM) the students' ability to understand selected hydrology-related threats for mountain catchments and to scientifically analyze and evaluate important influencing factors, to present it to an audience, and to conduct a discussion about the presented subject in a clear and concise scientific manner is assessed. The final grade is an averaged grade from the presentation (65%) and the written exam (35%).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Introduction in Hydrometeorology and management of water resources.

#### Content:

In the Field Course Applied Hydrometeorology of Mountain Catchments we will visit selected research stations, field sites, hydrological infrastructure, restoration sites, and protected areas in the Munich PreAlpine and Alpine area and learn more about hydrology-related threats for mountain catchments ranging from Glacier melt to Munich's drinking water. Sites include e.g. Environmental Research Station Schneefernerhaus, KIT Alpine Campus Garmisch, Waldklimastation Kreuth, Sachenbach catchment, Versuchstation Obernach, Sylvensteinspeicher, Walchenseekraftwerk, Versuchsstation Wielenbach, Mangfall / Lech Wassereinzugsgebiet.

The Hydrological Modeling course includes:

- 1) Dominant hydrological processes in mountain catchments: Precipitation types, runoff generation, concentration and flood routing
- 2) Data in mountain catchments: Availability, quality, acquisition and analysis

- 3) Types of hydrological models
- 4) Generation, parameterization and calibration of the process based hydrological model WaSiM
- 5) Model sensitivity analyses with focus on meteorological input and land use scenarios.

**Intended Learning Outcomes:**

After completion of the module, the students understand the main processes in mountain catchments like runoff generation, runoff concentration and flood routing processes. Additionally, they are able to use a physically based hydrological model to simulate the rainfall runoff process in mountain catchments and its influencing parameters caused by the special circumstances of these regions in a widely realistic and transparent way. The students are able to generate event based scenarios as well as land use scenarios and understand recent hydrology-related threats for mountain catchments as well as the influence of climate change on hydrological processes and management in mountain areas. They remember suitable monitoring and risk prevention strategies and are able to analyze, evaluate and communicate (both oral and written) a specific case study or research questions related to the experimental sites visited to a general audience.

**Teaching and Learning Methods:**

Teaching methods include lecture as well as practical exercises at PC laboratory in respect to hydrological modelling, a week of field trip to Alpine and pre-alpine areas to the listed sites with guided tours by local scientists, administrators, TUM lectures as well as short presentations by the students.

**Media:**

PowerPoint Presentation, Hydrological model (e.g. WaSiM), Field work

**Reading List:**

IPCC (2013) Fifth Assessment Report; Shelton ML (2009): Hydroclimatology - Perspectives and Applications; IPCC (2008) Technical Paper VI on Climate Change and Water

**Responsible for Module:**

Responsible for Module: Prof. Dr. Annette Menzel - Professur für Ökoklimatologie Hans-Carl-von-Carlowitz-Platz 2, 85354 Freising, 08161/ 71-4740, menzel@wzw.tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Introduction in Hydrological Modelling (Vorlesung, 2 SWS)  
Chiogna G

Field Course in Applied Hydrometeorology (Vorlesung mit integrierten Übungen, 3 SWS)  
Menzel A [L], Kloos S, Lüpke M, Menzel A  
For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4206: Material Flow Management and Applications | Material Flow Management and Applications

Version of module description: Gültig ab winterterm 2018/19

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a research paper of around 12-15 pages which is the means to evaluate whether the students have understood and whether they are able to apply the methodology of material flow management on a case study in a scientifically manner and to create an own scientific paper about concepts for material flow management and treatment of materials based on the methodologies of material flow analysis and life cycle assessment. management and treatment of materials based on the methodologies of material flow analysis and life cycle assessment.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

knowledge in natural science (biology, chemistry, ecology, physics);  
understanding for engineering science and also for social/cultural aspects.

#### Content:

The students acquire detailed and differentiated knowledge about the following topics:

- need of material flow management
- procedure of material flow management
- material and substance flow analysis
- material flow assessment by sustainability indicators
- life cycle assessment
- development of strategies and measures for material flow management  
(e.g. resource efficiency, urban mining, industrial ecology, bio-economy, circular economy).

### **Intended Learning Outcomes:**

By the means of the module the students are able to:

- understand the necessity of material flow management
- understand the relationships between different processes, technological treatments of materials and organizational measures
- apply the procedure of material and substance flow analysis
- apply the assessment methods of indicator systems and life cycle assessment
- create concepts for material flow management and treatment of materials.

### **Teaching and Learning Methods:**

Concerning teaching methods, lecture and presentation parts provide the theoretical foundation of materials flow management. Real case studies are introduced to the students and worked out in the class. Likewise within interdisciplinary projects in reality, the students have to define and to solve problems collaboratively in group work by studying specialist literature and data sources. At the end they have to create a research paper as homework about this topic. The students are supervised by tutorials by the lecturer.

### **Media:**

Power point presentation, lecture sheets, case studies of material and substance flow analysis and life cycle assessment.

### **Reading List:**

Brunner, P.H., Rechberger H. (2004): Practical Handbook in Material Flow Analysis. Advanced Methods in Resource and Waste Management. Lewis Publishers, Boca Raton, pp. 318.  
Brunner, P.H.; Rechberger, H.; 2016: Handbook of Material Flow Analysis: For Environmental, Resource, and Waste Engineers. Taylor & Francis Inc; 2. Revised Edition, pp. 453  
Weber-Blaschke, G.; 2009: Stoffstrommanagement als Instrument nachhaltiger Bewirtschaftung natürlicher und technischer Systeme. Ein kritischer Vergleich ausgewählter Beispiele. Schriftenreihe „Nachwachsende Rohstoffe in Forschung und Praxis“ des Wissenschaftszentrums Straubing, Bd. 1, Verlag Attenkofer, Straubing, 330 S.

### **Responsible for Module:**

Prof. Dr. Gabriele Weber-Blaschke - Lehrstuhl für Holzwissenschaft Hans-Carl-von-Carlowitz-Platz 2, 85354 Freising; 08161/71- 5635; weber-blaschke@hfm.tum.de

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Material Flow Management and Application (Vorlesung, 3 SWS)

Weber-Blaschke G [L], Weber-Blaschke G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### BGU38023: Engineered Natural Treatment Systems | Natürliche Aufbereitungsverfahren

Version of module description: Gültig ab winterterm 2016/17

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 3	<b>Total Hours:</b> 90	<b>Self-study Hours:</b> 60	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The proof of performance will be made in the form of a 60-minute written exam. The aim of the written exam is to prove understanding of basics and mechanisms of natural treatment systems and the ability to plan and design simple systems based on natural treatment processes by using existing guidelines. The answers mostly require partly own formulations, but also ticking given single or multiple answers and short calculations will be required. For the exam no aids are permitted except for a non-programmable calculator. The examiner will provide additional documents if needed for the exam.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Water and Wastewater Treatment Engineering

#### Content:

This module deals with processes and application of engineered natural treatment systems. Major abiotic and microbial transformation processes will be discussed in general and with respect to different applications including vertical flow and horizontal flow constructed wetlands, bank filtration and different applications of managed aquifer recharge technology. In addition, students will learn basics on enzymatic processes and reactions. The module also comprises engineering aspects for design and operation of engineered natural treatment systems as well as contents from ongoing research towards optimization of these systems and combinations with other treatment processes for water reuse.

#### Intended Learning Outcomes:

Upon successful completion of this module, students are able

- To describe major mechanisms and key parameters for contaminant removal in natural treatment systems
- To explain microbial and enzymatic processes and their dynamics in natural treatment systems
- To outline design of wastewater treatment with constructed wetlands for small communities based on local parameters
- To characterize methods and applications of bank filtration and groundwater recharge and discuss their potential for application in future water concepts

**Teaching and Learning Methods:**

Lehr- und Lernmethoden:

The module will be taught as a seminar by explaining major content in form of short lectures with integrated discussion. Furthermore, students will work in groups to develop solutions for selected case studies within the seminar. Additional field trips will help to further understand learned contents.

**Media:**

Presentation, group work

**Reading List:**

Will be announced at the beginning of the course.

**Responsible for Module:**

Hübner, Uwe (u.huebner@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Natürliche Aufbereitungsverfahren (Seminar, 2 SWS)

Hübner U [L], Hübner U

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### ED160017: Sustainable Manufacturing | Nachhaltige Produktion [SuM]

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module examination is held as a written exam (90 min) in order to be able to check the learning outcomes achieved by means of short and comprehension questions as well as complex application examples and calculation tasks. A non-programmable calculator can be used as an aid. The students calculate, among other things, various technically and economically relevant sustainability variables and parameters on the basis of given practical examples.

Thus the learning outcomes examined include basic aspects on awareness of the need for sustainable production, sustainability in the context of production, the holistic view of sustainability, manufacturing engineering measures, as well as assessment and measurement and standardisation of sustainability in production. In addition, the topics of sustainable design and use of products, energy and resource efficiency in production, social sustainability in production, data-based sustainability assessment in production and industrial circular economy are examined.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Knowledge of the basics of production and related areas (logistics, product development, etc.) is recommended but not mandatory.

#### Content:

The module covers all relevant aspects regarding the topic "sustainable manufacturing" including a general overview, ways of assessing sustainability and methods to improve sustainability in an industrial context.

Lecture units:

- Sense of urgency: Why do we need to act now?
- Sustainability in the context of manufacturing
- Thinking sustainability holistically



- Manufacturing technology measures
- Evaluate, measure and standardize sustainability in manufacturing
- Sustainable design and use of products
- Energy and resource efficiency in production
- Social sustainability in production
- Data-based sustainability assessment for manufacturing
- Industrial circular economy

The module also includes exercise units, e.g. how to conduct an LCA, how to follow ISO 14001 for sustainability assessments, practical exercise on system thinking, group activity (develop suggestions for improvement of sustainability for an exemplary company).

### **Intended Learning Outcomes:**

After attending the module, students can understand the importance of addressing the topic of sustainability, understand the fundamentals of sustainable manufacturing, evaluate the possible technical lever in a production that can be addressed to increase sustainability, analyze products regarding the potentials for being produced more sustainably, apply the concept of system thinking on sustainable manufacturing, and apply methods to measure sustainability.

### **Teaching and Learning Methods:**

The module takes place in the form of a lecture and an exercise. In the lecture, the basics of sustainable production are explained using PowerPoint presentations. The basics of sustainable production are deepened by means of use cases, expert presentations and practical application examples. In this way, participants learn, for example, how to carry out a life cycle assessment, how to follow the standards of ISO 14001 for sustainability assessments, or how to use systems thinking to find solutions. The lecture is rounded off by guest lectures from industry in order to give students an insight into current industrial issues relating to sustainability in production.

In the exercise, the methods and concepts learned in the lecture are applied to concrete examples. The participants can create solution concepts directly with the exercise instructor and thus apply what they have learned directly to industrial or academic practical examples. They thus learn, for example, how energy and resource efficiency in production can be increased, how social sustainability in production can be integrated into production management, or which measures need to be taken for data-based sustainability assessment in production.

### **Media:**

Presentations, Videos, Additional Literature

### **Reading List:**

- Neugebauer (2014): Handbuch Ressourcenorientierte Produktion. Hanser. ISBN: 978-3-446-43008-2
- Garbie (2016): Sustainability in Manufacturing Enterprises. Springer. ISBN: 978-3-319-29304-2
- Stark et al. (2017): Sustainable Manufacturing. Challenges, Solutions and Implementation Perspectives. Springer. ISBN: 978-3-319-48513-3
- Meadows (2008): Thinking in Systems. Chelsea Green. ISBN: 978-1603580557

- DIN EN ISO 14040: Umweltmanagement – Ökobilanz – Grundsätze und Rahmenbedingungen
- DIN EN ISO 14001: Umweltmanagementsysteme – Anforderungen mit Anleitung zur Anwendung

**Responsible for Module:**

Zäh, Michael; Prof. Dr.-Ing.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Sustainable Manufacturing - Exercise (Übung, 1 SWS)

Zäh M, Paul M, Schneider D, Sippl F, Wörle M

Sustainable Manufacturing (Vorlesung, 2 SWS)

Zäh M, Paul M, Schneider D, Sippl F, Wörle M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI001215: Network and stakeholder analysis: Sustainable resource use and agri-food system | Network and stakeholder analysis: Sustainable resource use and agri-food system

Version of module description: Gültig ab winterterm 2019/20

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

There will be a 120-minute written exam. A written exam is necessary in order to assess the holistic understanding and analytical competencies of the students. In the exam, students will describe, discuss and analyze the concepts, dimensions and methodological approaches related to network and stakeholders in sustainable resource management and agri-food sector.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in cooperation and sustainability

#### Content:

The module deals with the theoretical concepts, methodologies and measurement indicators and approaches of networks and stakeholders for sustainable resource management and agri-food system. Specific topics include the following:

- Network and stakeholder theories and concepts to understand, describe and explain the structure, characteristics, interactions among networks and stakeholders
- Concepts and approaches to examine network and stakeholder compositions, engagements, conflicts and influences in designing and implementing strategic decisions related to sustainable innovation, resource management and agri-food system.
- Types, levels and extents of risk associated with stakeholder engagement in implementing sustainability related projects and programs

- Specific methodological approaches, tools and indicators to evaluate and prioritize the performances, outcomes and implications of different network and stakeholder constellations.
- Other relevant current network and stakeholder issues in sustainable innovation, resource management and agri-food system.

### **Intended Learning Outcomes:**

After completing the module, students are able to

- understand the theories, concepts, principles and frameworks underlying network and stakeholder issues, influences and collaborations for sustainable innovation, resource management and agri-food system
- apply relevant techniques and tools for describing social, economic, environmental and institutional contexts of network and stakeholder management and engagement policies and strategies towards achieving specific sustainable goals.
- analyze types, levels and extent of risks associated with stakeholder engagement and commitment in implementing sustainability related projects and programs
- critically assess and evaluate the structure, characteristics, and impacts of various forms of networks and stakeholder groups on the outcomes of sustainable resource management, innovation and agri-food system.

### **Teaching and Learning Methods:**

The module includes lectures, individual and group exercises, reading assignments, and presentations. The lectures will provide theoretical and conceptual basis. Individual and team exercises will be used to analyze and discuss specific network and stakeholder issues and their solutions.

### **Media:**

Präsentationen, Fallbeschreibungen, Skripte

### **Reading List:**

Freeman, R.E (1984). Strategic Management: A stakeholder Approach. Boston.  
Prell, C., K. Hubacek and M. Reed (2009). Stakeholder analysis and social network analysis in natural resource management. *Society & Natural Resources* 22(6): 501-518.  
Chiffolleau, et al. (2014) Understanding local agri-food systems through advice network analysis. *Agric Hum Values*, 31:19–32  
Lange, P. et al. (2015). Sustainability in Land Management: An Analysis of Stakeholder Perceptions in Rural Northern Germany. *Sustainability*, (7): 683-704.  
Reed, M. S. et al. (2009). Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management* 90(5): 1933-1949.

Mcadam, et al. (2016). Regional Horizontal Networks within the SME Agri-Food Sector: An Innovation and Social Network Perspective. *Regional Studies*, 50(8): 1316–1329

Katz, N. et al. 2004. Network Theory and Small Groups. *Small Group Research*, 35(3): 307-332.

Sandström, A. and C. Rova (2010). Adaptive co-management networks: A comparative analysis of two fishery conservation areas in Sweden. *Ecology and Society* 15(3): 14.

Bixler, et al. R (2016). Network governance for large-scale natural resource conservation and the challenge of capture. *Frontiers in Ecology and the Environment* 14(3): 165-171.

Bixler, R. P. et al.(2016). Networks and landscapes: A framework for setting goals and evaluating performance at the large landscape scale. *Frontiers in Ecology and the Environment*, 14(3): 145-153.

Ernstson, et al. (2010). "Scale-crossing brokers and network governance of urban ecosystem services: The case of stockholm." *Ecology and Society*, 15(4): 28.

Muñoz-Erickson, T. A. and B. B. Cutts (2016). Structural dimensions of knowledge-action networks for sustainability. *Current Opinion in Environmental Sustainability*, 18: 56-64.

Wubben, E. and Gohar Isakhanyan. (2011). Stakeholder Analysis of Agroparks. *Int. J. Food System Dynamics* 2(2), 2011, 145#154.

The list will be expanded and updated using other thematically relevant books, journal articles and periodical newsletters and others.

**Responsible for Module:**

Abate Kassa, Getachew; Dr. rer. hort.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Network and stakeholder analysis: Sustainable resource use and agri-food system (WI001215, englisch) (Vorlesung, 4 SWS)

Abate Kassa G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2719: Landscape Planning | Landscape Planning

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The attainment of learning outcomes for the module will be assessed in a piece of research paper of around 10 pages in which students work independently on complex issues of contemporary landscape planning demonstrating their breadth of understanding in drawing out implications of their findings and putting them into a broader context. The written assignment is complemented by a presentation and/or a colloquium of around 30 min for assessing the capacity of the students to communicate their findings orally to an audience. Depending on the number of participants, research paper and accompanying talk may be prepared either individually or in groups.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic understanding of environmental systems; Module WZ2713 Methods of Scientific Communication. For the LP seminar, class discussion is a core element. Therefore, students are expected to take part and contribute to the discourse.

#### Content:

Concerned with the stewardship and enhancement of environmental systems, Landscape Planning is the key planning instrument for nature conservation and landscape management in Germany. The module introduces Landscape Planning and reflects on its potential contribution to sustainable land use with a focus on non-urban areas.

Course 1: Lectures will address the guiding principles, formal instruments and procedural elements of Landscape Planning; present methodological approaches for the assessment of landscape functions and ecosystem services including methods and tools for data collection, analysis and evaluation; illustrate target formulation and implementation strategies with examples from the planning practice.

Course 2: The seminar gives students the opportunity to deepen their knowledge by reflecting on readings and planning documents as well as by discussing in class such topics as: contemporary and emerging scientific theories and methodological approaches relevant for environmental planning; rationale of stakeholder involvement; context-dependency of spatial planning; comparison of current jurisdictional and institutional arrangements on landscape-related planning in the home countries of the students and their implications.

**Intended Learning Outcomes:**

Upon completion of the module, students are able to:

- recognize the purpose and objectives of Landscape Planning;
- explain instruments and procedural elements of contemporary Landscape Planning;
- select appropriate methods and tools to assess landscape functions and ecosystem services;
- be aware of the role of Landscape Planning in the decision-making upon the use of land;
- retrieve and interpret information from different sources;
- communicate key concepts relevant for environmental planning (both written and oral).

**Teaching and Learning Methods:**

Lectures provide subject specific knowledge; class discussions of selected readings engage students in critical thinking; in group work activities students experience the application of selected methods and tools.

**Media:**

Lectures, presentations, class discussions, small group exercises, assigned readings.

**Reading List:**

Haaren, C. v., Lovett, A. & C. Albert (2019): Landscape Planning with Ecosystem Services – Theories and Methods for Application in Europe. Springer Nature, Dordrecht. Additional material will be provided.

**Responsible for Module:**

Dr. Isabel Augenstein [i.augenstein@tum.de](mailto:i.augenstein@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Landscape Planning - seminar (Seminar, 2 SWS)  
Augenstein I

Landscape Planning - lecture (Vorlesung, 2 SWS)  
Augenstein I

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### EI74831: Project Lab Renewable and Sustainable Energy Systems | Project Lab Renewable and Sustainable Energy Systems [PropENS]

Version of module description: Gültig ab winterterm 2018/19

<b>Module Level:</b> Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Participants of the Project Lab Renewable and Sustainable Energy Systems should carry out analyses, planning and applications about renewable energy systems and their modelling. A team of 3-5 students should achieve a goal defined for the group over the duration of the lecture period of the semester within the framework of the project work. The problem definition, role distribution, idea development as well as the choice of suitable instruments, implementation and documentation are to be developed essentially independently by the group. The essential aspects of the work within the framework of the project internship (e.g. essential scientific contents, the treatment of a task as a completed project, division of the task among the group members) should be documented in a written report (volume: 15-20 pages).

In a supplementary presentation, the competence of the students to present their work in a structured way in a small seminar in front of an audience consisting of staff members of the chair and students will be examined. Overall, competencies in project work in the team as well as in documentation and presentation of the work should be demonstrated. The report is included in the grade with 40 %, the presentation and the cooperation in the team with 30%.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge about:

- Power systems
- Renewable energies (potentials, technologies)
- Matlab / Simulink



**Content:**

These are research-related and practice-oriented tasks whose topics are in line with the current research areas of the chair, such as:

- Modeling, simulation and / or regulation of energy systems
- Investigation of the potential of renewable energies
- Analysis and generation of data for energy systems
- Evaluation and interpretation of model results
- Planning and installation of plants for the use of renewable energies on the Campus Garching

**Intended Learning Outcomes:**

After successfully completing the module, the student is - depending on the topic - able to:

- recognize challenges of integrating renewable energies,
- apply and implement appropriate tools and methods to analyze, plan or regulate energy systems,
- interpret and evaluate results from applied models.

**Teaching and Learning Methods:**

Project tasks are carried out individually or preferably in groups of 2-4 students. In the process, self-dependence respectively teamwork is supported in the processing of a project task.

Depending on the topic, a literature research may be necessary. The main part of the project internship, however, is the computer-aided development of analysis and evaluation tools or the planning and execution of laboratory tests or installations.

The participants will finally have the opportunity to practice preparing and holding presentations.

**Media:**

- Application of various programs or programming languages (Matlab / Simulink, Python, etc.)
- Test benches (renewable energy conversion plants, real-time simulator, measuring instruments)
- Presentations

**Reading List:**

Konstantin, Panos: Praxisbuch Energiewirtschaft - Energieumwandlung, -transport und -beschaffung, Übertragungsnetzausbau und Kernenergieausstieg, Springer Vieweg, Springer-Verlag GmbH Deutschland, eBook ISBN 978-3-662-49823-1, DOI 10.1007/978-3-662-49823-1, Hardcover ISBN 978-3-662-49822-4

Wagner, Ulrich; Heilek, Christian (Bearb.): Nutzung regenerativer Energien (Vorlesungsskript), 10., vollständig überarbeitete Auflage, Herrsching, E & M, Energie-&-Management-Verl.-Ges., 2009, ISBN: 978-3-9805179-3-5

The Power of Transformation - Wind, Sun and the Economics of Flexible Power Systems, International Energy Agency, OECD/IEA, 2014, France, ISBN: 978 92 64 20803 2

Hillier, Frederick S., Lieberman, Gerald J.: Introduction to operations research, New York, McGraw-Hill Education, 2015, ISBN: 978-0-07-352345-3, 0-07-352345-3, 978-0-07-126767-0, 978-1-259-25318-8, 1-259-25318-X

**Responsible for Module:**

Hamacher, Thomas; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Projektpraktikum Erneuerbare und Nachhaltige Energiesysteme (Forschungspraktikum, 4 SWS)

Hamacher T, Kuhn P, Breuning L, Cadavid Isaza A, de la Rua Lope C, Halilovic S, Kerekes A, Kleeberger H

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI001205: People in Organizations: Managing Change and Sustainability in Agribusiness and the Food Industry | People in Organizations: Managing Change and Sustainability in Agribusiness and the Food Industry

Version of module description: Gültig ab winterterm 2018/19

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment type for the module is a graded report (100%). The report includes memorandums addressing 9-10 of the case studies discussed in class; and a concept paper addressing an organizational concept. The concept paper is also presented by each student. Through the case memorandums, the students demonstrate the ability to discuss the assigned case questions by selecting and applying suitable theoretical concepts to agribusiness and the food industry. Building on the reflection process for each individual memorandum and the cases, which build on each other, deep-level contextual learning is achieved. In the concept paper, students demonstrate their ability to research and critically evaluate a current organizational concept. Through the presentation and discussion of the concept paper, students demonstrate their ability to communicate theoretical concepts and their application to agribusiness and the food industry.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

This is an advanced module. Prior knowledge of economic and management concepts is required. Successful completion of a management course on MSc. level is required, e.g., Human Resource Management in Agriculture and Related Industries or Agribusiness Management. Experience in desk research and scientific writing is required. Knowledge of basic concepts of human resource management and management skills is required.

### **Content:**

The module builds on key concepts of economics and management, specifically human resource management, to provide master level students with knowledge in organizational behavior, theory, and development and build competencies in organizational analysis and change.

Topics covered include:

- metaphors of and perspectives on organizations, their strengths and limitations
- the role of the individual, the group, and the organization in a high performance environment
- organizational structures and the organization-environment fit
- corporate social responsibility, sustainability challenges, business ethics, and ethical conduct in bio-based industries
- adapting to current challenges and changes in the institutional environment of agriculture and the food industry
- understanding organizational change, facilitating change processes, and overcoming barriers in the context of agribusiness and the food industry.

### **Intended Learning Outcomes:**

After successfully completing the module students are able to analyze, evaluate, and change organizational management and development practices in the agribusiness and food industry context. Specifically, students are able to

- select and apply suitable theoretical concepts or models of organizational behavior, theory, and development to meet organizational challenges in agribusiness and the food industry
- contrast the strengths and limitations of different perspectives on organizations
- evaluate the potential impacts of various organizational management options on the individual, group, and organizational levels
- identify ethical challenges and options to organizations in agribusiness and the food industry
- adapt organizational practices and policies to sustainability measurement requirements and develop organizational sustainability or CSR (corporate social responsibility) policies
- structure organizational change processes, apply models of organizational change, and evaluate a model's potential implications
- adapt organizational management and development practices to the specific context in agribusiness and the food industry.

### **Teaching and Learning Methods:**

The course People in Organizations: Managing Change and Sustainability in Agribusiness and the Food Industry has a seminar format based on the case study method. The seminar format is implemented based on case descriptions of problems, challenges, and innovations in agribusiness and food industry supply chains. Through individual document research and individually prepared class discussions and group work, students develop the ability to critically reflect on and apply concepts of organizational behavior, theory, and development in the context of agribusiness and the food industry. Through presentations and concept discussions, students develop in-depth knowledge of exemplary theoretical concepts. During class discussions and group presentations, students reflect on their experiences, prior knowledge, and assignments to develop their conceptual and evaluative skills and to adapt theoretical knowledge to practical challenges

**Media:**

Reading assignments; case descriptions; presentation software; discussion facilitation support media, such as flipcharts and discussion boards; video clips and podcasts.

**Reading List:**

Selected chapters from

Brown, Donald R. (latest edition). An Experiential Approach to Organization Development, Prentice Hall: Boston.

Daft, Richard L. (latest edition). Organizational Theory and Design. South-Western/Cengage Learning.

Kreitner, Robert and Kinicki, Angelo (latest edition). Organizational Behavior. McGraw-Hill Irwin.

Morgan, Gareth 2006. Images of Organization. Updated ed., Sage: Thousand Oaks/CA.

**Responsible for Module:**

Vera Bitsch bitsch@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4082: Plantation Forestry and Agroforestry | Plantation Forestry and Agroforestry

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning outcomes are assessed by an oral examination (30 min). Based on specific problem statements the students have to demonstrate their ability to analyze and assess the situation, to understand the origin of the problem and to propose solutions adapted from the methodologies and techniques procured in the course.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

none

#### Content:

Plantation forestry: Background, Definitions, Plantations in the Context of International Forest Policy, Plantation Forestry Purposes, Plantation Silviculture, Management and Economics;  
 Agroforestry (AF): Introduction (global land-use problems, definitions, terminology), Traditional AF Systems, Environmental, economic and socio-cultural aspects of AF, Interactions in AF systems, Important tree groups in AF (NFT's, MPT's, Palms), Planning in AF, Legal aspects  
 Forest Management for Carbon Sequestration: Role of forests in the global carbon cycle, Possible impacts of climate change on forests, International climate policy, Forest in the Kyoto Protocol (KP), Flexible mechanisms of the KP, REDD and REDD+, Forest management options, Modelling forest sequestration with CO2FIX, Case studies.

#### Intended Learning Outcomes:

Students will be able to

- understand and evaluate the major issues of plantations in the context of international forest policy,

- explain the fundamental purposes of Plantation Forestry,
- properly deploy the essential techniques of Plantation Silviculture, e.g. for establishment, tending and maintenance
- critically examine plantation projects (management, work volume, economic results).
- understand the fundamental principles and practices of agroforestry land use,
- analyze the interactions among different components of an AF system,
- assess the ecological and economic effects of AF-systems and develop adequate management options,
- address problems in the context of rural development and identify AF-based solutions
- understand the role of forests and forest management activities in the global C-cycle,
- assess forest management options for different purposes within the framework of the international climate policy,
- identify and develop concepts for mitigation projects.

### **Teaching and Learning Methods:**

Knowledge and skills are imparted by lectures, group discussions, presentation of case studies and small exercises; the learning methods are learning, reviewing scientific articles, and research reference articles. The lectures will provide theories and basic reference materials which will be deepened and proved by reviewing articles. The achieved skills will be used to develop and discuss solutions for specified problems.

### **Media:**

PowerPoint presentations, case studies, additional reading material

### **Reading List:**

ABARE - JaakoPöyry (1999): Global Outlook for Plantations. Australian Bureau of Agricultural and Resource Economics (ABARE) Research Report 99.9, [www.abare.gov.au](http://www.abare.gov.au). Evans, J., Turnbull, J. W. (2004): Plantation forestry in the tropics. FAO, (1998): FRA 2000 - Terms and definitions. Forest Resources Assessment Programme, Working Paper 1. FAO (2001): Global Forest Resources Assessment 2000. FAO Forestry Paper 140. Pandey, D. and Ball, J. (1998): The role of industrial plantations in future global fibre supplies. *Unasylva* 193, Vol. 49, 37 - 43. Sawyer, J., (1993): Plantations in the Tropics. Smith, D.M., Larson, B.C., Kelty, M.J. and Ashton, P.M.S. (1997): The Practice of Silviculture: Applied Forest Ecology. Smith, J. (2002): Afforestation and reforestation in the clean development mechanism of the Kyoto protocol: implications for forests and forest people. *Int. J. Global Environmental Issues* 2 (3/4): 322-343. Shepherd, K.R. (1986): Plantation Silviculture. West, P. W. (2006): Growing Plantation Forests. Ashton, M.S. and Montagnini, F. (2000): The silvicultural Basis for Agroforestry Systems. *Agroforestry: Principles and Practice: Special issue of Forest Ecology and Management*, 45 (1991). Nair, P.K.R. (2012): Agroforestry, the future of global land use. Atangana et al. (2014): *Tropical Agroforestry*. Springer Verlag

### **Responsible for Module:**

Annighöfer, Peter; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Plantation Forestry (Vorlesung, 2 SWS)

Annighöfer P [L], Annighöfer P

Agroforestry and Forest Management for Carbon Sequestration (Vorlesung, 2 SWS)

Annighöfer P [L], Annighöfer P, Thom D

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ4197: Protected Areas Biodiversity and Management | Protected Areas Biodiversity and Management

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Final written examination of 90 minutes in the field of protected areas biodiversity and its management to examine whether the students have understood the problematic of securing biodiversity in protected areas and are able to verify conservation measurements.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Successful completion of the 1st semester of the Master Program Sustainable Resource Management is recommended

#### Content:

Biodiversity and protected areas: A worldwide survey on ecozones and altitudinal belts of the world as carriers of natural biodiversity; protection of biological units; IUCN protected areas classification, the European FFH Directive as an example of a continent-wide tool for nature protection.

Habitat analysis and management: Habitat types, tools for protecting habitats, design of management plans, visitor management, best practice examples in sustainable biodiversity and habitat protection.

#### Intended Learning Outcomes:

On successful completion of the module students are able to:

- to put ecosystems and its utilisation options as well as its threats into a global perspective
- give clear options for further management, both regarding utilisation and protection

**Teaching and Learning Methods:**

Lecture, case studies, practical experiments / demonstrations, discussions.

**Media:**

PowerPoint Presentation.

**Reading List:**

Jürgen Schultz (2005): The Ecozones of the World: Ecological Divisions of the Geosphere. Springer, Berlin. 459p.

**Responsible for Module:**

Kühn, Ralph; Apl. Prof. Dr. agr. habil. ralph.kuehn@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Protected Area Management (Vorlesung, 2 SWS)

Kühn R [L], Gula R, Theuerkauf J

Biodiversity in Protected Areas (Vorlesung, 2 SWS)

Kühn R [L], Gula R, Theuerkauf J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4202: Political and Social Perspectives of Renewable Resources | Political and Social Perspectives of Renewable Resources

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Oral presentation of the group project work, review paper for a scientific journal. The learning outcomes are assessed by a group project work concerning a selected topic related to the political and social perspectives of renewable resources. Therefore students have to prepare a scientific paper for an international journal of their choice and give a short oral presentation about the work done for the paper, similar to what would be expected in a 15 minute conference presentation.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Knowledge of sustainable resources (materials and energy). Scientific writing.

#### Content:

In the lectures a number of examples of societal aspects of Sustainable Resource programs will be presented and discussed. Backgrounds are global developments such as urbanization, the rise of countries like China and India, resource availability and technological developments. Case studies deal with tropical forestry and pros and cons of tropical hardwood uses, urban planning, vernacular architecture and the use of renewable resources. We take a tour around the world and look at social housing programs in Europe, Brazil and South-East Asia. Furthermore we look at successes and failures in the German/European energy policies in comparison to the United States.

#### Intended Learning Outcomes:

After this course, students should be able to:

1. Develop SR stimulation programs on country or regional level and priority analysis of renewable resource applications
2. Assess priorities for development and application of renewable resources in countries with different levels of development
3. Critically analyze existing SR programs taking into account social values of stakeholders,
4. Assess impacts of global developments such as urbanization and UN-policies on SR.

**Teaching and Learning Methods:**

Discussion and creativity sessions. Project work evolving in a scientific paper for a journal of choice. Oral presentation.

**Media:**

Lectures, UN-policy notes, Discussion and Creativity sessions.

**Reading List:**

Tba

**Responsible for Module:**

van de Kuilen, Jan Willem; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Political and Social Perspectives of Renewable Resources (Vorlesung, 4 SWS)

van de Kuilen J [L], van de Kuilen J, Khaloian Sarnaghi A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS10003: Remote Sensing of Agriculture and Vegetation | Remote Sensing of Agriculture and Vegetation

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module assessment is based on a written report (10 pages - A4 single line excluding references; 70% of grade) in combination with a presentation (15 min; 30% of grade). In the report, the students design a strategy of applying remote sensing to gain insights into improving decision making for solving practical problems (e.g., food security, overuse of agrichemicals, biodiversity) in agricultural and vegetation systems.

The students are examined based on the extent to which they are able to:

- situate the problems and strategy in a relevant context
- describe the state of the art and knowledge gaps in the relevant field
- demonstrate deep understanding on methodology
- break down the strategy into workable tasks
- discuss the strategy critically from interdisciplinary perspectives
- show communicative competence

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in agricultural engineering is an advantage

#### Content:

Remote sensing provides a versatile tool for earth observation and environmental informatics from varied spatial and temporal scales. This module explores the potential and the future trend of the state-of-the-art remote sensing techniques in facilitating the understanding on as well as decision making in agricultural and vegetation systems. We will discuss the fundamentals of remote sensing science, including but not limited the topics below:

- Biophysical-spectral models (e.g., electromagnetic radiation (EMR), radiative transfer, spectral feature extraction, chlorophyll fluorescence);
- Sensor systems (e.g., satellite, drone) and spectral-radiometric measurements;
- Image processing and pattern recognition (e.g., classification, time-series)
- Applications in agriculture and ecology (e.g., crop stress, productivity and biodiversity monitoring)

Through integrated exercise, the students will learn about innovative methods of remote sensing and the use of remote sensing in interdisciplinary fields of agricultural and environmental sciences.

### **Intended Learning Outcomes:**

Upon successful completion of this module, students are able to:

- Understand the important aspects of remote sensing;
- Relate the technologies to research questions and practical problems in other disciplines;
- Apply innovative concepts and methods to agricultural and vegetation systems;
- Evaluate the feasibility of remote sensing from the perspectives of agriculture and ecology;
- Develop a strategy of integrating remote sensing with domain knowledge for decision making in agricultural and vegetation systems;
- Communicate their strategy with good understanding and evidence.

### **Teaching and Learning Methods:**

- This module combines lectures, guest seminars, field trips and computer exercises.
- The teaching content will be organized by topics instructed in both theoretical (e.g., seminar) and practical ways (e.g., hands-on demonstrations, computer programming).
- The students will learn the important concepts and methods of remote sensing, as well as the applications in addressing environmental and societal problems, in a highly interactive manner, e.g., discussion in seminars, collaborations in exercises.

### **Media:**

- Present and virtual lectures
- PowerPoint, instruction manuals, scripts and codes;
- Field and lab hands-on demonstrations;

### **Reading List:**

Literature will be provided according to individual topics and events.

### **Responsible for Module:**

Yu, Kang; Prof. Dr. rer. nat.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Remote Sensing of Agriculture and Vegetation (Vorlesung mit integrierten Übungen, 4 SWS)

Yu K [L], Yu K, Camenzind M, Mokhtari A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS10004: Research Project 'Smart Agriculture' | Research Project 'Smart Agriculture'

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 10	<b>Total Hours:</b> 300	<b>Self-study Hours:</b> 150	<b>Contact Hours:</b> 150

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module assessment is based on a report (15 pages – A4 single line excluding references; 70% of grade) in combination with a presentation (15 min; 30% of grade). The students usually hand in the report and do the oral presentation in 4 weeks after the practical work has been concluded.

The grade of the written report is based on:

- 1) the description of the theoretical background, research questions and objectives of the project (20%);
- 2) the proper description and use of methods, including statistical analysis (20%);
- 3) the accuracy and correctness of the results, results interpretation and discussion (30%);
- 4) the quality of presentation formats (e.g., tables, figures) (10%);
- 5) the overall structure and quality (20%), particularly examines whether the report is situated and summarized in a concise and coherent manner, in the relevant context of the research area.

The grade of the oral presentation is based on:

- 1) The explanation of the background, state of the art, research questions/ hypothesis (30%)
- 2) The accuracy and correctness of methods, data and results interpretation (40%)
- 3) The relevance and rigor of discussion (20%)
- 4) The presentation quality and skills, e.g., powerpoint format and clarity (10%)

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

It is recommend to take the course 'Remote Sensing of Agriculture and Vegetation'

Basic knowledge in plant and soil sciences, agricultural engineering and remote sensing is an advantage

Basic programming skills (e.g., R, Matlab, Python) will be an big advantage

### **Content:**

Smart Agriculture or precision agriculture is considered as a high-tech and interdisciplinary field. Students will learn how to apply and combine multidisciplinary technologies, including but not limited to, field survey, lab biochemical analysis, phenotyping, remote sensing, image analysis and AI techniques to characterize plant traits and their responses to the environment and stresses (e.g., drought). Through specific research questions and objectives, students will explore the potential and limitations of applying the new technologies to solve practical problems, e.g., in the following categories:

- Using unmanned aerial vehicles (UAV) based images (e.g., RGB, multispectral) for high throughput analysis of crop traits (e.g., height, chlorophyll), and for yield estimation and weed detection.
- Using satellite remote sensing images to monitor the spatiotemporal variability in crop health (e.g., nitrogen, water status), biomass and yield in response to environmental and climate changes.
- Correlating leaf and plant optical properties to stresses (e.g., drought) and explaining plant phenotypic and genotypic variations with the aid of hyperspectral data and radiative transfer models.
- Mapping soil spatial variability based on proximal- and remote sensing of soil physical and chemical properties using hyperspectral and multispectral data.
- Applying machine learning (ML) and deep learning (DL) to analyze satellite remote sensing data for crop type and area mapping;
- Applying ML and DL methods to analyze plant images (e.g., UAV) to detect specific objects (e.g., flowers, wheat ears) as a proxy of seed germination, plant health, productivity and biodiversity.

### **Intended Learning Outcomes:**

Upon successful completion of this module, students will be able to:

- understand the theoretical background knowledge related to smart agriculture;
- define research questions for their selected topics in the related research area;
- apply sensor and imaging techniques for data collection in the field and laboratory;
- acquire computational and artificial intelligence (AI) skills for big data handling and data evaluation;
- interpret the results of statistical analysis and machine learning models;
- present the research findings in a concise manner in written and oral form;
- gain competence in applying proximal- and remote sensing, and AI technologies in precision agriculture.

### **Teaching and Learning Methods:**

- The students conduct a semester (normally three months) research project. The schedule of field or lab work can be adjusted according to the student's curriculum.



- Three to five students team up as a group and define the research topic and proposal through discussion with the lecturer.
- The lecturer teach students through theoretical (e.g., seminar) and practical instructions (e.g., hands-on demonstrations, computer exercises).
- Students conduct the project through teamwork (3-5) and collaborations with doctoral students.
- Periodic meeting with the supervisor to discuss the progress of project.
- Journal club discussing related scientific articles with the lecturer and peers.
- Seminars to present project output and exchange with fellow students.

**Media:**

- PowerPoint, instruction manuals, scripts and codes;
- Field and lab hands-on demonstrations;
- TUM-Moodle, Zoom

**Reading List:**

Literature will be provided according to individual projects.

**Responsible for Module:**

Yu, Kang; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Research Project 'Smart Agriculture' (Projekt, 10 SWS)

Yu K [L], Yu K, Camenzind M, Mokhtari A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS10007: Remediation of Contaminated Sites – Lecture and Seminar | Remediation of Contaminated Sites – Lecture and Seminar

Version of module description: Gültig ab summerterm 2023

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The type of assessment of the module will take the form of a Klausur and a Presentation, each of which will count for 50% of the final grade. Klausur and Presentation must be accomplished with a mark of 4.0 or better, each.

The competences acquired in the lecture are subject of a written exam (Klausur 60 min, no supporting materials), where the students demonstrate their ability to identify problems and find solution strategies. In the seminar, the students prove with an oral presentation (20-30 minutes) their ability to analyze selected case studies about contaminated sites, to develop remediation concepts and to explain their understanding to their fellow students demonstrating their communication skills in front of an audience. The presentation is accompanied by an essay (6-8 pages).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Knowledge in natural sciences (chemistry, physics and biology) is necessary. The module "Introduction to Soil Science" (also parallel in the same semester) is recommended.

#### Content:

Lecture: Bundesbodenschutzgesetz (Federal Soil Protection Act), investigation of contaminated sites, sector-specific contaminations, assessment of contaminants, risk potential, ecotoxicological tests, investigation methods, sampling strategies, analyses, remediation objectives, decontamination procedures, rehabilitation and remediation procedures.

Seminar: Investigation and remediation of contaminated sites by means of selected case studies

**Intended Learning Outcomes:**

After attending the lecture, the students are able to understand legal regulations dealing with contaminated sites. They know adequate procedures for the investigation of contaminated sites and suspected contaminated sites as well as for the remediation of contaminated sites. They are able to evaluate the hazard potential of a contaminated site in terms of pollutant type and emission pathway and understand the different investigation methods. After attending the seminar, the students are able to analyze studies about contaminated sites, to prepare remediation concepts and to evaluate applied remediation measures.

**Teaching and Learning Methods:**

Manifold site contaminations occur in our environment and plenty different remediation methods exist. The overview is best given in a lecture.

Professionals working in soil remediation must thoroughly understand a specific contamination problem and develop individual remediation plans. This is the purpose of the seminar, where students work independently and in groups, and then present and discuss the results.

**Media:**

Presentations

**Reading List:**

Lecture: presentation notes

Seminar: bibliographies to the seminar topics

**Responsible for Module:**

Bucka, Franziska, M.Sc. [franziska.bucka@tum.de](mailto:franziska.bucka@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Remediation of Contaminated Sites - Regeneration of contaminated soils (Vorlesung, 2 SWS)

Bucka F

Remediation of Contaminated Sites – Investigation and remediation methods (Seminar, 2 SWS)

Heister K, Höschen C, Bucka F

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS20016: Rhizosphere Research | Rhizosphere Research

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

This module is graded, and students are asked to give a seminar presentation complemented by the submission of an extended summary on a selected topic to demonstrate a solid understanding of topics discussed in the lectures. The oral presentation is expected to be 15 min presentation followed by a subsequent 30 min discussion to demonstrate that he or she is able to respond competently to any questions, suggestions, or discussions brought by the audience and relating to his or her subject area. The extended summary is expected to be a minimum of 5 pages and will be graded. Students will be informed about the grading criteria of their extended summary during the lecture via a template. The presentation will be scheduled within the last three weeks of the semester. The extended summary should be submitted by the end of the semester.

In addition, there is the option of taking a voluntary mid-term assignment as coursework in accordance with APSO §6, 5. For this, an oral examination (30 min) has to be given. The oral exam targets the learning outcomes of the lecture of Soil Biophysics. The module grade can be improved by 0.3 by passing the course work if this better characterizes the student's performance level based on the overall impression and the deviation has no influence on passing the examination. No repeat date is offered for the mid-term performance. Successfully passed mid-term assignments will be considered when retaking a failed module examination at the next possible examination date.

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

**Content:**

The scope of this module is to learn fundamental biophysical processes taking place at the root zone and particularly at the root-soil interface and their emerging impacts on water and nutrient exchange between the soil-plant-atmosphere continuum. In this module, we will discuss the basic principles of soil physics in the context of water and nutrient transport within soils and plant roots. The particular attention is to learn why, when, and where soil physics plays an important role in water and nutrient transport across the soil-plant-atmosphere continuum.

**Intended Learning Outcomes:**

This module aims to enable students:

- 1) To mechanistically describe the theories of water and nutrients retention and transport across the soil-plant-atmosphere continuum
- 2) To mechanistically discuss why and when plant access to soil resources is limited in different soils and how plants may deal with these limitations
- 3) To evaluate the potential roles of different belowground traits (soil and plants) in improving plant access to limited soil resources under different conditions
- 4) To explore the state-of-the-art search in the field of soil-plant interactions and rhizosphere

**Teaching and Learning Methods:**

This module consists of two parts:

1) Lecture on Soil Biophysics: In weekly lectures, students will be introduced to the principle of water and nutrient transport within porous media, such as the soil-plants-atmosphere continuum. We will first begin by introducing students to the fundamental principle of the following key physical processes in soils: water retention in soil, water potential (freedom) in soils, the flow of water within soils, infiltration, evaporation, transpiration, root water uptake, and solute transport within soils. Then we will continue by focusing on the feedback between soil and plants and soil and microorganisms. Students will learn how biota's life (plants and microorganisms) may impact soil's physical properties and how the physical properties of soil may impact the emergence of life in soils.

2) Seminar on New emerging topics in Soil Biophysics: This seminar aims to discuss the fundamental biophysical and biochemical processes taking place across the soil-root interface and their emerging impacts on water, nutrient, and carbon flux across the soil-plant-atmosphere continuum. Students will be briefly introduced to some selected state-of-the-art topics and will be asked to perform a deep literature review and present their findings in the form of an oral presentation and an extended summary at the end of the semester.

**Media:****Reading List:**

**Responsible for Module:**

Zare, Mohsen, Prof. Dr. mohsen.zare@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

New emerging topics in Soil Biophysics (Seminar, 2 SWS)

Zare M

Soil Biophysics (Vorlesung, 2 SWS)

Zare M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI001255: Lecture Series Renewable Energy Systems in the Global South | Ringvorlesung Erneuerbare Energiesysteme im Globalen Süden

Version of module description: Gültig ab summerterm 2020

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 135	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Written exam of 60 minutes:

- In multiple-choice questions and short questions, it is examined if the students are able to name and explain facts regarding renewable energy technologies, decentralized energy systems and their utilization and operation in the Global South correctly.
- In computational tasks, it is examined if the students are able to classify relevant location parameters correctly and perform calculations on renewable energy technologies correctly in order to design decentralized energy systems in the Global South according to the framework conditions of a certain location.
- In text tasks, it is examined if the students are able to classify and evaluate technological, economic and social factors influencing renewable energy technologies, decentralized energy systems and their utilization and operation in the Global South correctly.
- The exam is graded.
- Up to 20% of the exam can be multiple-choice questions.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

- Bachelor degree in an engineering study program or a study program, which included technological/engineering aspects (such as B.Sc. Management & Technology)
- Interest in various renewable energy technologies, decentralized energy systems and their utilization and operation in the Global South
- Interest in the socio-economic factors influencing the utilization of renewable energies in the Global South

### **Content:**

Overview of renewable energy technologies including their functionality, their technological and economical assessment, their integration in decentralized energy systems as well as business concepts for their utilization in the Global South:

- Renewable energy systems in the Global South - Why and how?
- Small-scale solar thermals and photovoltaics
- Small-scale hydro-power
- Small-scale wind-power
- Small-scale biogas systems
- Battery storages
- Electrical components of mini-grids
- Rural electrification planning through Geo Information Systems
- System sizing through least-cost modelling
- Sustainable energies and entrepreneurship in the Global South
- Sustainable enterprises for Renewable Energies in the Global South
- Rural electrification projects in the Global South

### **Intended Learning Outcomes:**

After successfully completing the module, students are able to

- Name and explain facts regarding renewable energy technologies, decentralized energy systems and their utilization and operation in the Global South.
- Perform calculations regarding renewable energy technologies in order to be able to design decentralized energy systems in the Global South.
- Classify and evaluate technological, economic and social factors influencing renewable energy technologies, decentralized energy systems and their utilization and operation in the Global South.
- Develop concepts for decentralized energy systems in the Global South based on the technological, economic and social framework conditions of a certain location.

### **Teaching and Learning Methods:**

Lectures and presentations by various researchers from TUM as well as entrepreneurs and other experts from the field of Renewable Energies in the Global South.

In exercise lessons, the taught knowledge of the lectures are applied to exemplary topics. After each lecture, the students conduct these exercises in homework and afterwards, these are discussed during the upcoming exercise lesson. Most of these exercises are calculating tasks about the technical components, but there are also some exercises regarding the financial assessment of renewable energy technologies. The exercises are not graded.

### **Media:**

The following media types are used:

- Computer-aided presentations for the lectures
- Exercises
- Discussion of provided literature



**Reading List:**

- Presentation slides of the speakers
- Solutions of exercise lessons
- Other literature recommended by the speakers

**Responsible for Module:**

Belz, Frank-Martin; Prof. Dr. oec.

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1674: Research Methods and Economic Research Project | Research Methods and Economic Research Project

Version of module description: Gültig ab summerterm 2015

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Examination Duration (in min.): 30.

The course grade consists of two parts: 50% project report and 50% in-class grade. The in-class grade consists of equal parts each, proposal presentation, project results presentation, peer review of another student's proposal, peer review of another student's project results, and discussion of applications of economic concepts.

Justification: Students demonstrate their ability to apply economic concepts through class discussions and development of project ideas.

Students demonstrate their ability to develop an economics research projects through the stages of proposal presentation, result presentation, and project report.

Students demonstrate their ability to evaluate other researchers' proposals and results in a constructive manner through presentations of reviews.

Students demonstrate their ability to manage resources, and deadlines through timely submission of the enumerated tasks in stages throughout their research projects.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

BSc. Degree. Prior knowledge of basic ideas of economics and management recommended.

#### Content:

The module provides master level students with an advanced understanding of the research process, its quality criteria, and the application of economic concepts to questions of food and agriculture. Key economic ideas are applied to everyday questions in class discussions based on economic texts, podcasts, and others. The development, execution, publication, and review of

disciplinary and interdisciplinary research is explained in lectures and carried out by each student from beginning to end.

Steps include developing project ideas and research questions; using peer-reviewed literature to frame a student project; designing research plans with the appropriate methods and suitable techniques of data collection; structuring, preparing, presenting, and critically reviewing research proposals; data collection, data analysis, and data presentation; discussion and conclusions based on reflecting own empirical research in the light of the literature; disciplinary, professional, and ethical quality criteria of research in economics and management

### **Intended Learning Outcomes:**

Students are able to apply economic ideas to questions related to food and agriculture in everyday life.

Students are able to develop and execute an economic research project in the field of agriculture, horticulture, and food.

Specifically, students are able to develop a project idea, develop a research question and objectives based on the project idea and the related scientific literature, and create a research plan, including the suitable combination of research methods and techniques; defend a research proposal based on the research plan.

Students are able to evaluate other (student) researchers' proposals and present such evaluations in a suitable form, orally.

Furthermore, students are able to apply their research plan through data collection, data analysis, and presentation of research results, in oral and written form; and are able to evaluate other (student) researchers' research process, results, and conclusions.

Students are able to manage resources and deadlines.

### **Teaching and Learning Methods:**

Lectures, class discussions, and guided student project development and project evaluation (project proposal, proposal review, project results, results review, and research report).

### **Media:**

Presentation slides, websites, articles and short texts, multi-media (podcasts, video clips), student presentations, and reviews.

### **Reading List:**

Hartford, Tim (latest edition). *The Undercover Economist*. Random House: New York.

O'Leary, Zina (latest edition). *The Essential Guide to Doing Your Research Project*. Sage: Los Angeles.

Committee on Science, Engineering, and Public Policy,  
National Academy of Sciences, National Academy of

Engineering, and Institute of Medicine (latest edition). *On Being a Scientist: A Guide to Responsible Conduct in Research*.

### **Responsible for Module:**

Vera Bitsch bitsch@tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

Seminar

Research Methods and Economics Research Project

4 SWS

Vera Bitsch

TUM

bitsch@tum.de

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2720: Renewable Energy Technologies | Renewable Energy Technologies

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a written test, where the students have to prove that they understand and remember the basic technical principles related to energy production and the working principles of the presented renewable energy technologies, as well as the related ecological and economical properties and frame conditions. The students have to answer questions, but may also be asked to do calculations, complete figures or prepare sketches.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

General understanding of natural science, mathematics and basics of technology.

#### Content:

The course provides an overview of the basics of thermodynamics and the principles of energy conversion. Energy conversion and its importance for the economy is discussed. Because of their transitional character due to the German "Energiewende", the course focusses on the European and German energy systems. The international students in the course are expected to support the lecture with their experiences from abroad.

Basic technical principles of energy production, efficiencies, costs and environmental impacts will be understood. The focus lies on the following areas: solar, wind, water and geothermal energy conversion.

The course provides an overview of the basics of thermodynamics and the principles of energy conversion. Energy conversion and its importance for the economy is discussed. Because of their transitional character due to the German "Energiewende", the course focusses on the European and German energy systems. The international students in the course are expected to support the lecture with their experiences from abroad.

Basic technical principles of energy production, efficiencies, costs and environmental impacts will be understood. The focus lies on the following areas: solar, wind, water and geothermal energy conversion.

In order to complete the picture, also storage and fossil fuel technologies will be discussed. The students will understand their role and their contribution to balancing energy production and demand.

**Intended Learning Outcomes:**

At the end of the course, the students understand the technical principles of renewable energy conversion systems.

They are able to interpret energy scenarios and solve simple problems associated with a high renewable energy share and its implications on society.

The students can estimate the importance of distinct technologies for a sustainable energy supply.

**Teaching and Learning Methods:**

Lecture with integrated exercises and teamwork, as well as discussions to improve understanding.

**Media:**

Power point presentation, black board, Videoclips

**Reading List:**

Tba

**Responsible for Module:**

Benedikt Schweiger (benedikt.schweiger@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Renewable Energy Technologies (Vorlesung, 4 SWS)

Schweiger B [L], Kerscher F, Schiffler C, Schweiger B

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2737: Remote Sensing and Image Processing | Remote Sensing and Image Processing

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Achievements will be assessed by exercises, a presentation and a final report (project work). On behalf of home exercises the students get a first insight into concepts of image analysis. "Hands on" exercises with state of the art software packages are employed to train the main image processing steps and to assess the understanding of the students in implementing the basic concepts of remote sensing from data take to data analysis. Regular discussions with the tutor measure the student's ability to develop an idea from initial concepts to the complete picture within a given timeframe, delivering interim results at relevant milestones (35%). On behalf of a presentation of a topic related to remote sensing the student's ability to understand a technical/scientific subject, to analyze and evaluate facts and factors of influence, to summarize the subject and present it to an audience, and to conduct a discussion about the presented subject is assessed. With the final report the students demonstrate that they have gained deeper knowledge of the specific image analysis software packages and its components, of differing analysis concepts and that they are prepared to evaluate an existing situation as imaged by the respective remote sensing data set. They demonstrate further that they are able to create new geodata layers appropriated to be analyzed in an integrating GIS environment (65%). The grade weights of module examination components correspond to the weighting factors given in brackets.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Module "Inventory Methods and GIS" of the 1th semester of the Master Program "Sustainable Resource Management" passed, computer skills at least at working level .

### **Content:**

The implementation of data interpretation and information extraction concepts and techniques is trained "hands on" with the help of advanced image processing and analysis programs. Topics: 1. Introduction to image processing concepts; 2. Implications of air- and space borne data takes; 3. Data types: Digital aerial photographs, high to very high resolution multispectral and hyperspectral scanner data, LIDAR data; 4. Development of interpretation keys; 5. Exercises on data pre-processing; 6. Unsupervised and supervised classification concepts, pixel-based, object based classification strategies; 7. Exercises on land use/land cover classification; 8. Basic verification concepts; 9. Exercises on the extraction of bio-geo-chemo-physical parameter from RS data; 10. Change detection concepts; 11. Interrelation of Remote Sensing with GIS; 12. Access and data download from geodata provider.

### **Intended Learning Outcomes:**

At the end of the Remote Sensing and Image Processing module (RSIP) the students are able to:

- decide which data set is most appropriated to solve his thematic task, - access data bases, download and open a data set for image processing, - geocode/georeference digital data sets,
- develop appropriated interpretation keys fitting the data set and the targeted thematic goal,- visualize and enhance the data set for interpretation, - extract spectral signatures, - calculate indices on behalf of the data,
- learn how to extract bio-geo-chemo-physical parameter from the data set, - perform unsupervised and supervised classifications, - proof the quality of the results by an accuracy assessment, - perform a change detection study, - export the results as GIS layer.

### **Teaching and Learning Methods:**

By using advanced image processing software packages the theoretical explained concepts are exercised "hands on" and discussed on basis of different data types applying the "just in time teaching (JiTT)" technique; the practical courses are prepared by homework (presentation of specific related topics, exercises); the short presentations will be given during the courses, contents, layout and style discussed and narrated; the home exercises explained in close relation to the computer exercises just done. The definition of the problem to be solved by image analysis techniques and the development of appropriated solutions needs research of reference materials. The final outcome of the courses, the classification result, will be used as basis for the Module "Application Study" of the concentration field "Landscape Management".

### **Media:**

Image processing software and tutorials, prepared exercises, different data types

### **Reading List:**

The literature recommended within the Modules "Inventory Methods and GIS", "Remote Sensing and Image Processing", [www.wiau.man.ac.uk/courses/cvmsc/Terminol.htm#SplitMerge](http://www.wiau.man.ac.uk/courses/cvmsc/Terminol.htm#SplitMerge); [http://www.pfc.cfs.nrcan.gc.ca/landscape/inventory/wulder/large\\_area\\_rs/index.html](http://www.pfc.cfs.nrcan.gc.ca/landscape/inventory/wulder/large_area_rs/index.html); <http://www.pfc.cfs.nrcan.gc.ca/landscape/inventory/wulder/hirespres.html>; Uni Zürich, RSL: <http://www.geo.unizh.ch/rsI2/>; EARSeL: <http://www-earsel.cma.fr/>; <http://www.ccrs.nrcan.gc.ca/ccrs/>



eduref/tutorial/indexe.html; <http://observe.ivv.nasa.gov/nasa/education/reference/main.html>; <http://rst.gsfc.nasa.gov/starthere.html>

**Responsible for Module:**

Mengesha, Mengistie Kindu; Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Remote Sensing and Image Processing (Vorlesung, 6 SWS)

Mengesha M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS20023: Soil and Plant Hydrology | Soil and Plant Hydrology

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

This module requires students to complete a graded seminar presentation and submit an accompanying extended summary on a chosen topic to demonstrate a solid understanding of topics discussed in the lectures. The oral presentation should be a 15-20-minute presentation, followed by a 30-minute discussion session to showcase the student's ability to respond effectively to any questions or discussions related to their subject matter. The extended summary should be a minimum of 5 pages and will be evaluated using the criteria outlined in a template provided during the lecture. The presentation is scheduled to take place during the last three weeks of the semester, and the extended summary must be submitted by the end of the semester. The oral presentation (counts for 30% of the final grade) is a prerequisite for the submission of the extended summary (counts for 80% of the final grade).

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

#### Content:

Upon completion of this module, students will have an understanding of the principles of soil and plant water relations. This includes studying the physics of water flow across various components of the soil-plant-atmosphere continuum such as soils, the rhizosphere, the root system, xylem, and leaves. Additionally, students will be introduced to various techniques for quantifying water flow across these key elements. In the end, students will be encouraged to discuss the potential of different soil and plant traits impacting plant drought tolerance under water and nutrient deficit condition.

### **Intended Learning Outcomes:**

This module is designed to provide students with a comprehensive understanding of the complex relationships between soil, plant, and water. Upon successful completion of this module, students will be able to:

- 1) Discuss the principle of water flow across soil-plant-atmosphere continuum.
- 2) Discuss potential mechanisms plants use to cope with drought stress, and how these mechanisms vary depending on the soil and climatic conditions. Indeed, how plants can adapt to different soil conditions, and how this adaptation affects their ability to tolerate drought stress.
- 3) Mechanistically describe/predict various physiological and anatomical adaptations that can improve plant access to soil resources under drying conditions.
- 4) Understand the state-of-the-art research in soil and plant hydrology in the context of drought stress.

### **Teaching and Learning Methods:**

The lecture on soil-plant hydrology will be a 2-hour session held weekly, where students will be introduced to the principles of water flow through the soil-plant-atmosphere continuum, starting from an individual single root and extending to the plant and canopy scales.

The lecture will consist of a combination of PowerPoint presentations and demonstrations on the whiteboard. The PowerPoint slides will be made available to students before each lecture.

For the seminar part, students will be introduced to the latest research and discussions in the field of soil-plant-water relationships and potential strategies to cope with drought stress. Each student will choose a topic from a list of options, conduct a literature review, and prepare an oral presentation and an extended written summary. Students will be offered individual one-to-one meetings to guide them in the preparation of their oral presentation and extended summary.

### **Media:**

### **Reading List:**

### **Responsible for Module:**

Zare, Mohsen, Prof. Dr. mohsen.zare@tum.de

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Soil plant water relationship (Vorlesung, 2 SWS)

Zare M [L], Zare M

Seminar on Water, nutrients and carbon exchange across soil-plant-atmosphere continuum (Seminar, 2 SWS)

Zare M [L], Zare M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WI001165: Sustainable Entrepreneurship - Getting Started | Sustainable Entrepreneurship - Getting Started

Version of module description: Gültig ab summerterm 2017

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module assessment consists of project work. Students are divided into teams of 3 to 5 students. Starting from the student's initial idea, each team has to develop a sustainable business model over the term. By working in a team, students demonstrate their ability to manage resources and deadlines together and to be able to complete their tasks in a team environment.

Each team will work on assigned tasks. Each group member has to contribute to the final group presentation (a 15 minutes pitch per team, 25%) that will take place during the last session of the term. By presenting their sustainable business plan, students demonstrate they are capable of presenting their business model in a clear and comprehensible manner to an audience. In addition, each team member will work on a section of the final written project report, describing and analyzing the sustainable business plan of the team. The written paper is due four weeks after the oral presentation (max. 8,000 words, 75%). By writing the project report students demonstrate that they are able to elaborate more in-depth on their sustainable venture. They also show their ability to apply the theory and real-life examples provided to them to their own idea and business model.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Modules in entrepreneurship, corporate sustainability and/or sustainability marketing are recommended.

#### Content:

Whether it is tackling climate change, resource degradation or social inequalities - responding to sustainability issues constitutes the biggest challenge for businesses in the 21st century. Embracing a great range of industries including food, energy or textiles, the field of life sciences is a key area for sustainability. Since the production of these goods accounts for an extensive

use of resources, there is great potential for effecting real improvements on a way towards more sustainable production and lifestyles. In this module we want to invite and inspire students to make a difference. We introduce them to the theory and practice of sustainable entrepreneurship, pursuing the triple bottom line of economic, ecological and social goals. We present the sustainable business model canvas as a tool for the students to explore their own ideas and to develop a sustainable business in the area of life sciences. Adopting a step-by-step approach, the following topic will be covered (all topics will be explained in general and then discussed in the context of life sciences):

- 1) The nexus of entrepreneurship and sustainable development
- 2) An overview of the theory and practice of sustainable entrepreneurship
- 3) Social and ecological problems as opportunities for sustainable entrepreneurship
- 4) Developing a sustainable customer value proposition
- 5) Describing key activities, resources and partners
- 6) identifying revenues and costs
- 7) Consolidating all parts in a lean and feasible business model
- 8) Pitching and presenting a business model

#### **Intended Learning Outcomes:**

Upon successful completion of this module, students will be able to (1) discuss and (2) evaluate the socio-economic challenges of the 21st century. They will be able to (3) evaluate the concept of sustainable entrepreneurship as a means for addressing these complex sustainability issues. More specifically, students will be able to (4) perceive socio-ecological problems as opportunities for sustainable entrepreneurship and to (5) generate their own ideas for a sustainable venture. In addition, participants will be able to (6) transfer the provided theory and examples to their own idea and (7) design their own business model. Students will (8) have gained experience and new skills in presenting in front of a large audience. Finally students are able to exchange in a professional and academic manner within a team. They show that they are able to integrate involved persons into the various tasks considering the group situation. Furthermore the students conduct solution processes through their constructive and conceptual acting in a team. They can make this contribution in a time limited environment.

#### **Teaching and Learning Methods:**

The module is a seminar which intends to familiarize the student with the theory and practice of sustainable entrepreneurship. Since the main goal of the module is to ignite entrepreneurial thinking and passion, as well as to provide the students with the required know-how to get started, the module has an interactive format with excursions and a project work in small groups. A special feature of the module is the co-teaching by an academic and a practitioner with a mutual interest in the theory and practice of sustainable entrepreneurship.

#### **Media:**

Presentations, slides, cases, links and further literature will be provided via [www.moodle.tum.de](http://www.moodle.tum.de)

**Reading List:**

The module is based on a few key scientific papers and practical tools such as the business model canvas. These form the basis for classroom discussions and are to be used for developing an own business model. All materials are provided as pdf files in TUM Moodle (<https://www.moodle.tum.de>).

Students should be familiar with the United Nations' Sustainable Development Goals (SDGs) and the basics of the business model canvas:

United Nations Sustainable Development Goals: <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Business Model Canvas:

Osterwalder, A. & Pigneur, Y. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. Wiley: New Jersey, US.

**Responsible for Module:**

Belz, Frank-Martin; Prof. Dr. oec.

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1567: Sustainability: Paradigms, Indicators, and Measurement Systems | Sustainability: Paradigms, Indicators, and Measurement Systems

Version of module description: Gültig ab summerterm 2019

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment type for the module is a graded report (10 pages). The report includes three sections: (1) critical analysis of a published empirical sustainability study in the context of its sustainability definitions and authors' backgrounds; (2) critical analysis of a sustainability measurement system in use with regard to fulfilling requirements to be met by indicators and indicator systems; (3) critical analysis of a public sustainability claim by an organization from a consumer or citizen point of view. Each analysis is also presented by each student. Through reports, the students demonstrate the ability to understand relevant research, measurement systems and claims, as well as critically analyze and discuss these issues. Through the presentation and discussion of each analysis, students demonstrate their ability to communicate these critical issues and further reflect on each topic in the light of other students' questions and presentations.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge and understanding of economic and management concepts as well as of social science research methods is required.

#### Content:

The development of a differentiated understanding of sustainability requires the critical analysis and reflection of sustainability concepts on multiple levels. In the module the following levels are systematically analyzed and discussed based on guided discussions of assigned readings and materials developed by students based on literature and internet research:

- Paradigms and value judgments in research on and evaluation of sustainability;

- Economic, environmental and social aspects of sustainable production, marketing, and consumption;
  - Measurement systems for sustainability on different levels (products, supply chains etc.);
  - Public and private standards, sustainability certifications and communication;
  - Consequences of measurement systems and their foci, e.g., on environmental aspects, such as carbon footprint, or on social aspects, such as fair trade
- These topics are discussed in the context to current and controversial issues regarding sustainability in science and in society.

### **Intended Learning Outcomes:**

After successfully completing the module students are able to

- Analyze and evaluate the consequences of different paradigms on the definition and understanding of sustainability and its use in published scientific articles;
- Analyze and evaluate sustainability measurement systems on the product, enterprise, and supply chain levels as well as their potential consequences;
- Evaluate public sustainability claims based on the research of available information sources;
- Apply a differentiated understanding of sustainability in an interrelated, globalized context with differing value systems and priorities in scientific and practical questions and issues.

### **Teaching and Learning Methods:**

The course “Sustainability: Paradigms, Indicators, and Measurement Systems” has a seminar format based on assigned readings and student presentations on assigned topic areas.

After an introductory guided class discussion on assumptions and implicit sustainability definitions of participants, readings are assigned and discussed in class to lay the basis for later student presentations. Through individual document research and individually prepared class presentations, students develop the ability to critically reflect on sustainability research, sustainability indicators and measurement systems, as well as sustainability claims by various actors and organizations. Through presentations and concept discussions, students develop in-depth knowledge of sustainability issues and hone their critical thinking skills. A final discussion summarizes students’ learning and additional findings throughout the semester in the concept of wicked problems.

### **Media:**

Reading assignments; use of data bases for literature research; presentation software; discussion facilitation support media, such as flipcharts and discussion boards; video clips and podcasts.

### **Reading List:**

National Resource Council 2010, Toward Sustainable Agricultural Systems in the 21st Century, Washington/D.C.: National Academies Press.

Current articles on sustainability paradigms, requirements of sustainability indicators and indicator systems, and applications.

### **Responsible for Module:**



**Courses (Type of course, Weekly hours per semester), Instructor:**

Sustainability: Paradigms, Indicators, and Measurement Systems (WZ1567) (Seminar, 4 SWS)

Bitsch V [L], Bitsch V, Carlson L

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1921: Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry | Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry

Version of module description: Gültig ab winterterm 2019/20

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment type for the module is a graded learning portfolio (100%). The portfolio includes memorandums addressing 9-10 of the case studies discussed in class; and a learning statement addressing conceptual, scientific and personal learning. Through the case memorandums, the students show the ability to discuss the assigned case questions by selecting and applying suitable theoretical concepts to supply chain management and sustainability challenges in the specific context of agribusiness and the food industry. In the learning statement, students demonstrate the ability to reflect on the semester long learning process and summarize the insights gained.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Solid economic and management background; knowledge of basic concepts of strategic analysis, planning, and management (e.g., industry analysis, horizontal and vertical coordination, and SWOT), as well as the ability to apply these concepts; furthermore, knowledge of value chain management is required (e.g., theoretical background, supply chain dynamics, actors and partnerships, governance). Successful completion of a management course on M.Sc. level required, e.g., agribusiness management or value chain management. Medium level experience in desk research and scientific writing is required.

#### Content:

The module builds on key concepts of supply chain management, strategy, and sustainability to provide master level students with the competency to evaluate pertinent issues in agribusiness and food industry supply chains.

Topics covered include:

- value propositions, creating and capturing added value in agribusiness and the food industry
- management of customers, suppliers, and other stakeholders
- innovation in supply chains, sustainability as an innovation, sustainable supply chains
- CSR (corporate social responsibility) and sustainability measurement
- implementation of a sustainability strategy, as well as costs and benefits of sustainable practices in agribusiness and the food industry
- ethical issues in supply chain management.

### **Intended Learning Outcomes:**

After successfully completing of the module, students are able to evaluate processes of supply chains management in agribusiness and the food industry.

Specifically, students are able to

- evaluate value propositions, as well as plans for creating and capturing value
- evaluate the management of customers, suppliers, and other stakeholders
- independently choose scientific models or concepts relevant to the analysis process of agricultural and food industry supply chains and justify their choice
- evaluate the implementation of a CSR concept or sustainability strategy, and monitor its effects on operations, suppliers, associates, and customers
- identify and analyze ethical issues in supply chain management and to recommend how to apply ethical practices.

### **Teaching and Learning Methods:**

The course Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry has a seminar format based on the case study method. The seminar format is implemented based on case descriptions of problems, challenges, and innovations in agribusiness and food industry supply chains. Through individually prepared class discussions and group work, students develop the ability to critically reflect and apply concepts of strategy, supply and value chain management, and sustainability requirements in the context of agribusiness and the food industry. During class discussions and group presentations, students reflect on their experiences, prior knowledge, and assignments to develop an in-depth understanding of current challenges in supply chains and how to address the.

### **Media:**

Reading assignments; case descriptions; presentation software; discussion facilitation support media, such as flipcharts and discussion boards; video clips and podcasts.

### **Reading List:**

Current articles from scientific journals as appropriate.

Selected chapters from

Bouchery, Corbett, Fransoo, and Tan (2017): Sustainable Supply Chains: A Research-Based Textbook on Operations and Strategy. Springer: Berlin, Heidelberg, Germany.

Pullmann and Wu (2011): Food Supply Chain Management: Economic, Social and Environmental Perspectives. Routledge, New York, US.

**Responsible for Module:**

Bitsch, Vera; Prof. Dr. Dr. h.c.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry (WZ1921) (Seminar, 4 SWS)

Bitsch V [L], Köksal S, Huhn-Kücükakyüz C, Carlson L

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2734: Soil Protection | Soil Protection

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In an oral exam of 30 minutes duration, students demonstrate in a scientific discussion by answering questions without helping material their broad and deep understanding on how to protect soils. The understanding of soils, as achieved in the modules "Introduction to soil science" and "World soil resources", is implicitly part of the oral exam.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

The successful completion of the module "Introduction to Soil Science" or equivalent skills are required. The successful completion of the module "World Soil Resources" is recommended.

#### Content:

Principles of soil degradation, the world food problem, highly erodible soils, semi-arid environments (including irrigation and salinization problems), kaolinitic soils, shifting cultivation, organic and mineral fertilization, agroforestry, land use and greenhouse gases, soil functions, organic pollutants, inorganic pollutants (heavy metals), radionuclides, pesticides, pathways of pollutants, sorption, precipitation, co-precipitation, acidification, ways to assess the mobility of pollutants, remediation of brownfields.

#### Intended Learning Outcomes:

The students are able to apply their knowledge of soils, as achieved in the modules "Introduction to Soil Science" and "World Soil Resources", to develop strategies of soil protection. They understand the major environmental factors that determine the food production in the world. They are able to address the specific problems of highly erodible soils, semi-arid land and kaolinitic soils and to design adequate land-use methods. The students understand the major factors that determine the fate of substances in soil. They are able to analyze and forecast the fate of heavy metals, organic

pollutants and radionuclides in soil and are familiar with important techniques for managing and remediating brownfields.

**Teaching and Learning Methods:**

Lecture, discussions

**Media:**

Presentation notes.

**Reading List:**

Blanco, H., Lal, R. (2008): Principles of soil conservation and management. Diamond, J. (1998): Guns, germs and steel. A short history of everybody for the last 13,000 years. Mirsal, I. (2008): Soil Pollution.

**Responsible for Module:**

Schad, Peter; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Bodenschutz - Organische und anorganische Schadstoffe in Böden (Vorlesung, 2 SWS)  
Bucka F

Soil Protection and World Food Production (Vorlesung, 2 SWS)

Schad P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### BGU70005: Transportation Economics | Transportökonomie [Transportation Economics]

Version of module description: Gültig ab winterterm 2017/18

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination type of the module is a project work.

In the project work, a realistic task from the area of the economic evaluation of transport systems (eg congestion charge, infrastructure investments, sharing concepts) is used to check whether the students are able to evaluate the suitability of the different assessment methods presented in the lecture and choose a suitable one for their project. They also show that they can apply the selected methods correctly to the concrete example, quantify them, and use the results to assess the feasibility and the impact of the project. The participants will do midterm and final presentations, and finally submit a written project work. The final grade will be determined as follows: midterm presentation: 15%, final presentation: 35%, written project work: 50%

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

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#### Content:

The module provides the students with an overview of the tools and methods that are available to evaluate transportation systems from an economic point of view. The following key areas will be covered:

- Introduction to Transport Economics
- Demand and Supply
- Equilibrium
- External Interactions
- Projects appraisal
- Transportation Investments

- Pricing
- Freight Economics
- Sharing Economy

**Intended Learning Outcomes:**

After completion of the module, the students will understand the methodological basis for the economic evaluation of transport systems and infrastructure investments. They are able to evaluate the main economic aspects from the field of transportation systems, transportation measures and investments. Additionally, the students are able to apply core theories of transport economy, such as external cost, marginal social cost, cost/ benefit considerations, demand/ supply interactions and elasticities to practical tasks, evaluate projects and use their calculation results for feasibility recommendations.

**Teaching and Learning Methods:**

Format: Lecture with integrated practical exercises;

Lectures provide the students with the theoretical basics of the economical assessment of transportation systems and projects, e.g. the various building parts of the models, their boundary conditions and application fields, as a Powerpoint presentation, supported by pictures, possibly films and discussions. Practical calculation tasks from realistic studies and models as well as the supervision of a project work provide the quantitative methods for quantitative methods for application and calculation of the methods as well as the interpretation of the model results for their use in feasibility and economic impact considerations for projects.

**Media:**

Presentation slides, whiteboard, readings

**Reading List:**

Small, Kenneth. Urban transportation economics. Vol. 4. Taylor & Francis, 2013.

Button, Kenneth. Transport economics. Edward Elgar Publishing, 2010.

Gómez-Ibáñez, José A., William B. Tye, and Clifford Winston, eds. Essays in transportation economics and policy: a handbook in honor of John R. Meyer. Brookings Institution Press, 2011.

**Responsible for Module:**

Antoniou, Constantinos; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Transportation Economics (Vorlesung mit integrierten Übungen, 4 SWS)

Antoniou C [L], Abouelela M, Antoniou C, Lu Q, Moghavem Ghaffari S

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ2936: Sustainable and Environmental Regulations | Sustainable and Environmental Regulations

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Successful completion of the course will be based in both seminars on the quality of the presentation in the seminar and a written executive summary on the topic of the presentation (course 1: presentation of around 30 min; executive summary of 5 pages; course 2: presentation of around 30 min; executive summary of around 3 pages).

The presentation is a means to measure the students' ability to understand the context and complexity of sustainable development in different countries and formal impact assessment procedures by preparing and delivering a well-researched and instructive oral presentation on a certain facet. An accompanying executive summary of major findings and conclusions indicates the capacity of the students to summarise the presentation in a clear and concise manner. In addition, the students are expected to show their oral communication skills by responding competently to questions and comments by the audience as well as by contributing to class discussions. Depending on the number of seminar participants, the presentation may be given either individually or in groups.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Class discussion is a core element of the seminars. Therefore, students are expected to take part and contribute to the discussions. Recommended Prerequisites: Module WZ2713 Methods of Scientific Communication.

#### Content:

Course 1 "Sustainable Development and Regime Type": The seminar introduces both the theoretical debate on sustainable development and the discussion about the role political regime type (democracy, autocracy, hybrid regime) play for the sustainability performance of a country.

What are the goals of "sustainable development"? Which policy areas have a strong relationship to sustainability? To what extent do countries differ in their "sustainability profile" in various policy areas? What influence does the regime type play in this regard?

The seminar investigates these theoretical and empirical issues in the context of pressing future challenges, such as rising government debt in many countries, growing global competition for innovation, and intensifying global environmental degradation and resource scarcity. The seminar will focus on discussing theoretical approaches to current "sustainability debates" and considering what defines generationally just behavior. In addition, empirically based comparisons of countries under different political leadership will be made looking at several sustainability areas (e.g. economic, financial, educational, research, family, pension, environmental and energy policy).

Course 2 "Methods of Environmental Assessment": The seminar introduces the methodology of EIA and SEA as worldwide established instruments for assisting sound environmental management. Being integral parts of spatial planning and decision-making, the assessment procedures integrate biophysical and socioeconomic information to predict and evaluate the environmental consequences of proposed projects, plans and policies and to suggest means to avoid or mitigate significant impacts. The seminar gives an overview of the concepts, methods, procedural elements of EIA and SEA and stimulates discussion on key aspects of environmental assessment.

#### **Intended Learning Outcomes:**

At the conclusion of the module, the students will have basic knowledge on sustainable development, its theoretical and empirical implications and its most important policy fields. The students understand the structure and the functioning of different political regimes and are able to evaluate their impact on the sustainable development of a country. Furthermore, the students are able to appreciate the purpose of EIA and SEA and their role in the decision-making process; explain the major principles and procedural steps of EIA and SEA; know options for estimating environmental impacts; reflect critically on the strength and limitations of the instruments; communicate findings in class and comment on the work of fellow students.

#### **Teaching and Learning Methods:**

In the SDRT seminar lectures, presentations and discussions provide students with a basic knowledge on sustainable development and political regime type and allows them to evaluate the performance of different states with regard to their sustainability performance.

In the MEA seminar, presentations by students and the lecturers provide the basis for exploring and discussing the concepts, methodology, current practice and potentials of environmental assessment. Class discussions engage students in critical thinking and analysing the scope and limitations of the presented material.

**Media:**

The module includes lectures, presentations, class discussions, (small group) exercises and assigned readings.

**Reading List:**

Wintrobe, R. (2000): The Political Economy of Dictatorship, Cambridge University Press, Cambridge; Tremmel, J. (2006): Handbook of intergenerational justice, Edward Elgar, Cheltenham; Glasson, J., Therivel, R. & A. Chadwick (2019): Introduction to Environmental Impact Assessment. 5th edition. Routledge, London and New York: 394 pages; Sadler, B., Aschemann, R., Dusik, J, Fischer, T.B., Partidário, M.R. & R. Verheem (2011): Handbook of Strategic Environmental Assessment. Earthscan, London, Washington, DC. Additional material will be provided.

**Responsible for Module:**

Augenstein, Isabel; Dr. agr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Methods of Environmental Assessment (Seminar, 2 SWS)

Augenstein I

(WZ2936) Sustainable Development and Regime Type (Seminar, 2 SWS)

Wurster S ( Mohammed N, Schmid H )

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### BGU38038: Urban Water-Energy-Food Nexus | Urban Water-Energy-Food Nexus [WEF Nexus]

Version of module description: Gültig ab summerterm 2021

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The proof of performance will be made in the form of a project. This project will be conducted in small groups of 6-8 students, whereby an individual thematic focus will be defined for each student. It consists of a group report (70%, 3-5 pages per student) and interim and final presentations (30%, ca. 5 min per student) where individual contributions will counts for 60% and group interaction for 40% of the grade. The aim of the project is to prove understanding of basics of different technical and non-technical components of integrated urban planning and their application in the development of simple urban planning projects. The project requires an intensive analysis of the thematic focus and thus the students prove an in-depth understanding of these components and the ability to combine these in an innovative way. This understanding will be proven using planning, geographic information systems-based, calculatory and modeling methods. At the end of the course, the students prove their ability to present and explain their concepts, approaches and methods in front of an expert audience through a presentation and a short discussion. Further, students proves their ability to work scientifically on their individual content through submission of the individual parts of the report.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Water and Wastewater Treatment Engineering (BGU38014)

#### Content:

This module deals with concepts, approaches and methods for integrated urban planning. Good practice examples are discussed in general terms before learning to apply these to a concrete case study city. In addition, students will learn about concepts and driving forces of the topics urbanization, globalization, climate change, environmental challenges, sustainability including UN

Sustainable Development Goals (SDGs) as well as current research on water reclamation with resource recovery.

**Intended Learning Outcomes:**

Upon successful completion of this module, students are able

- To know and explain contextual challenges and existing concepts, approaches and methods to address these
- To understand and explain international development dynamics and implications for natural resources consumption patterns
- To choose and compare technical and non-technical components of integrated urban planning
- To evaluate technical and non-technical components of integrated urban planning in terms of their context
- To develop innovative concepts and combinations of these components
- To communicate in an interdisciplinary group and collaborate on joint results
- To present own results in a scientific manner in presentations and a report

**Teaching and Learning Methods:**

The module will be taught as a combination of a lecture series and a project. Major content will be explained in form of lectures with integrated discussion. In the project, students will work with the guidance of the tutor to develop solutions for selected case studies. Following an introduction into the project, they will work in groups, where every student will work on individual aspects of the project. Results will be presented in a joint group report and a final presentation.

**Media:**

Presentations, group work

**Reading List:**

1. Hoff, H. (2011). Understanding the Nexus. Background Paper for the Bonn2011 Conference: The Water, Energy and Food Security Nexus. Stockholm Environment Institute, Stockholm, pp. 52.
2. Gondhalekar, D. and T. Ramsauer (2017). Nexus City: operationalizing the urban Water-Energy-Food Nexus for climate change adaptation in Munich, Germany. Urban Climate 19: 28–40, DOI: 10.1016/j.uclim.2016.11.004 [OA]

**Responsible for Module:**

Keilmann-Gondhalekar, Daphne (d.gondhalekar@tum.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

Urban Water-Energy-Food Nexus Planung (Vorlesung, 2 SWS)  
Keilmann-Gondhalekar D [L], Keilmann-Gondhalekar D

Urban Water-Energy-Food Nexus Projekt (Projekt, 2 SWS)  
Keilmann-Gondhalekar D [L], Keilmann-Gondhalekar D

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ0528: Urban Forestry | Urban Forestry

Version of module description: Gültig ab winterterm 2023/24

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The project work results in an illustrated report (max. 20 pages) prepared in small groups, which presents the results of the study on the growth and environmental performance of urban trees in a scientifically appropriate form. It includes a presentation of the problem and objective definition, theoretical foundations, methodology, results and their discussion, conclusions, bibliography. In the report, knowledge of the theory, state of knowledge in research and practice acquired in the lectures is to be demonstrated. The report comprises 80 % of the examination performance. The individual achievements of the individual students are to be marked in the report.

The results of the group work are to be presented in a PowerPoint presentation (duration: 10 minutes with subsequent discussion). The presentation comprises 20 % of the examination performance.

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

Basic knowledge of plant ecology and physiology is of advantage

#### Content:

Urban forests are defined as the entire stock of trees in urban (and peri-urban) areas. It includes the trees in all green spaces, from woodlands, public parks, streets and squares, institutional land, private gardens, transport infrastructures to spontaneously grown vegetation on derelict land. Urban forestry is an approach for the planning, design and management of the urban forest to provide aesthetic, ecological, social, and economic benefits to people living in cities – from strategic planning at the city and city regional level to the management of individual trees. The course aims to give an introduction into urban forestry for advanced students at Master level to provide them with knowledge and skills to for sustainable planning, design and management of

urban forests. The course consists of a lecture series and a study project. Lectures cover the following topics:

- Urban forestry for sustainable urban development: an introduction the concept
- Ecophysiology of urban trees
- Urban micro-climate and soil
- Growth and ecosystem services of urban trees
- Urban phenology
- Tree growth and structure
- Meeting human needs in multifunctional management of urban woodlands
- Urban woodland design & landscape architecture
- Process oriented modelling urban tree growth and ecosystem services
- Role of urban forests and trees in moderating urban climates
- Hardy tree species for urban sites

Participants will undertake a study on urban tree growth which provides them with an opportunity to obtain in-depth knowledge on growth patterns of different species and their ecosystem services in relation to environmental conditions in urban areas. The project is carried out on tree plantings in selected urban open spaces. Depending on the topic, it may include measurements of tree structural characteristics, tree ring analyses, determination of the leaf area index (LAI) and/or micrometeorological measurements. The data collected in this way can be used to determine ecosystem services such as biomass and carbon storage, or the cooling capacity due to shading. Simulation models may be applied for this purpose.

#### **Intended Learning Outcomes:**

On successful completion of the course, students (i) understand concepts of urban forestry and how these are applied in practice, (ii) understand the role of urban trees and urban green for the climate, (iii) know methods which are necessary for analysing and planning of urban forests, (iv) are able to analyse and evaluate ecosystem services of urban trees and urban greening, and (v) are able to apply this knowledge and skills in a study project.

In the study project, the students shall show that they are able to correctly apply a methodology for recording and analysing important parameters of the growth of urban trees in order to determine ecosystem services of trees (such as carbon storage, shading) with reference to the relevant scientific literature and to draw conclusions for the management of urban trees.

#### **Teaching and Learning Methods:**

Lectures to provide advanced knowledge on theoretical principles, methods and applications in urban forest research, planning, design and management.

Student measurement campaign for data collection with subsequent data analysis, to teach scientific methods of urban forestry research.

Student presentations of the results of a project exercise, for the acquisition of competences in the scientific communication of research results.

#### **Media:**

Classroom lectures with PowerPoint and possibly other media (e.g. videos), tutorial with guidance

**Reading List:**

Konijnendijk, C.C. Nilsson, K., Randrup, T.B., Schipperijn, J. (Eds.). Urban Forests and Trees in Europe – A Reference Book. Springer-Verlag, New York; further literature for the different themes of lectures will be introduced during the course

**Responsible for Module:**

Rötzer, Thomas; Apl. Prof. Dr. agr. habil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Urban Forestry (Vorlesung mit integrierter Übung) (Vorlesung, 4 SWS)

Lupp G, Pauleit S, Pretzsch H, Rahman M, Reischl A, Rötzer T, Torano Caicoya A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ1344: Urban Agriculture | Urban Agriculture

Version of module description: Gültig ab winterterm 2023/24

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module grade is based on a written report (approx. 20 pages; 80% of grade) complemented by an oral presentation (15 min. + 5 min. discussion; 20% of grade). In the report, the students design a strategy for ecologically oriented sustainable urban agriculture. Here, students should situate their strategy in a theoretical framework, and evaluate the relevant environmental and social context of their strategy. Written summaries measure the student's understanding and evaluation of ecological and social aspects, and ability to apply theoretical frameworks. In the presentation, the students present their strategy (PowerPoint plus any additional aides) to demonstrate understanding of an urban agriculture system, communicative competence, presentation, and discussion skills in front of an audience. Students may prepare the report and project individually or as a group (max. 3 students). In the case of group work, students must report academic contribution and their performance will be evaluated individually.

#### Repeat Examination:

Next semester / End of Semester

#### (Recommended) Prerequisites:

Basic knowledge in agriculture, landscape planning, and landscape ecology is an advantage

#### Content:

Urban agriculture has experienced a renaissance in recent decades. What are the possibilities for sustainable urban agriculture that supports multiple ecosystem services? This module explores ways in which urban agriculture can aid in the enhancement of food security, biodiversity, energy conservation, public health and well-being in cities. We will discuss the agro-ecological basis of urban horticultural production systems adapted for city environments. Topics include fundamentals of horticulture, soil properties and fertility, pest and pollinator management, animal agriculture, and climate change impacts. The students will learn about methods of urban agriculture and innovative approaches to ecologically-oriented and climate-resilient urban agriculture. In addition,

they will study how urban food production interacts with social, cultural, and political dimensions of urban environments (e.g. city policy, economics, human health) to foster an interdisciplinary understanding.

**Intended Learning Outcomes:**

On successful completion of the module, participants are able to:

1. Understand important agroecological aspects of urban agriculture such as biodiversity, soil management, and climate mitigation;
2. Relate social aspects of urban agriculture to environmental aspects such as public health and urban policy;
3. Apply interdisciplinary theoretical frameworks to urban agricultural systems;
4. Evaluate the environmental and social context of urban agriculture;
5. Create a strategy for a sustainable urban agricultural system in a project;
6. Communicate their strategy with understanding and evidence.

**Teaching and Learning Methods:**

The module is highly interactive and combines lectures with field trips and presentations from guests and peers. The lecture series will cover topics including: fundamentals of horticulture; soil management; pest and pollinator management; urban agriculture and climate change; challenges of urban agriculture; public health; and the business of urban agriculture. The seminars are based in experiential learning. In the seminars, we will 'see' cities as edible: in the present on field trips; in the past through films and advanced readings; and in the future through group presentations that design urban farming systems for future cities.

**Media:**

PowerPoint, films, virtual lectures

**Reading List:**

Egerer, M. & Cohen, H. (2021) *Urban Agroecology: Interdisciplinary Research and Future Directions*. CRC Press, Boca Raton, FL.

Carpenter, N., & Rosenthal, W. (2011). *The essential urban farmer*. Penguin.

Zeunert, J. (2018). Dimensions of urban agriculture. In *Routledge handbook of landscape and food* (pp. 160-184). Routledge.

Zimmerer, K. S., Bell, M. G., Chirisa, I., Duvall, C. S., Egerer, M., Hung, P. Y., ... & Yacamán Ochoa, C. (2021). Grand challenges in urban agriculture: ecological and social approaches to transformative sustainability. *Frontiers in Sustainable Food Systems*, 5, 668561.

**Responsible for Module:**

Egerer, Monika; Prof. Dr.

**Courses (Type of course, Weekly hours per semester), Instructor:**

HEF Summer School in Agroecology and Urban Agriculture (Vorlesung mit integrierten Übungen, 4 SWS)

Egerer M [L], Burger S, Egerer M, Schmack J

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2723: Utilization and Treatment of Special Materials and Waste | Utilization and Treatment of Special Materials and Waste

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 30

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The learning outcome will be assessed by presentation (40 minutes per working group; about 10 minutes per person). The presentation will be complemented by a brief written precis. This assessment method is a good means to evaluate both whether the students are able to work self-reliantly on a topic and to present their significant results to an auditorium and whether they have understood their respective selected topic.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in natural science (biology, chemistry, ecology, physics) and engineering.

#### Content:

The students acquire detailed and differentiated knowledge about the following topics:

- Selected materials, products and production processes concerning high waste generation and heavy environmental problems
- Origin and types of the specific wastes,
- Classical disposal,
- Waste as a source of raw material,
- Utilization for products,
- Energetic utilization,
- Legal specification.

The special topics addressed depend on relevance, e.g. food and food waste, sewage sludge, e-waste or the like.

**Intended Learning Outcomes:**

By the means of the module the students are able:

- to describe the differences of special waste, e.g. food waste and selected municipal or industrial waste,
- to classify the amount and quality of special waste streams,
- to analyze problems concerning the special wastes,
- to develop treatment measures to handle the waste for avoiding or reducing impacts on the environment and human health,
- to transmit developed solutions to other waste and new products.

**Teaching and Learning Methods:**

The module consists of a lecture, providing the theoretical foundations, in combination with a seminar including feedback by the lecturers to the students' work. The students have to define and to solve problems collaboratively in group work by studying specialist literature. At the end they have to prepare a presentation and a brief summary including problem statement and conclusions as homework under time constraint about this topic. The students are supervised by the lecturers.

**Media:**

PowerPoint Presentation

**Reading List:**

Oreopoulou V.; Russ W. (2007): Utilization of By-Products and Treatment of Waste in the Food Industry, Springer; New York.

Additional literature depending on themes.

**Responsible for Module:**

Weber-Blaschke, Gabriele; Apl. Prof. Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Utilization and Treatment of Special Materials and Waste (Seminar, 2 SWS)

Weber-Blaschke G [L], Reh K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS10006: Vertical Farming (MSc.) | Vertical Farming (MSc.)

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 6	<b>Total Hours:</b> 180	<b>Self-study Hours:</b> 120	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination performance is given in the form of a project work. It consists of a written report (approx. 15 pages; 60% of the grade), supplemented by two oral group presentations ((i) 60 min., 20% of the grade; (ii) 15 min. + 10 min. discussion, 20% of the grade). In the final written paper, students present their design for a concept for a Vertical Farming Indoor System on the Weihenstephan campus. In it, the students also demonstrate that they can evaluate the aspects of Vertical Farming with regard to your concrete application in the experimental station (Lab) on site. In the presentation (PowerPoint and additional tools), students collectively present an (i) analysis on vertical farming systems, hydroponics, aquaponics and related technologies, and a (ii) strategy to explain the Vertical Farming system, demonstrate their communication skills as well as their presentation and discussion skills in front of an audience.

#### Repeat Examination:

End of Semester

#### (Recommended) Prerequisites:

Basic knowledge in engineering, agriculture and computer sciences is an advantage.

#### Content:

The module will focus on Vertical Farming, which can contribute to the improvement of sustainable food production, resource management and energy conservation. The fundamentals of Vertical Farming production systems will be discussed and adapted to urban conditions. Concept development and design of Vertical Farming-systems (hydroponics and aquaponics), electrical and artificial intelligence, plant and pest management are the core topics of the module. Students will learn methods and innovative approaches for vertical farming systems, and they will develop the concept for a Vertical Farming indoor system as part of the Sustainable Living Lab initiative. The highly automated system with integrated lighting will serve as a prototype and be able to produce food 365 days a year.

The module will consist of a project (PT) where students have to design a Vertical Farming-system.

The Module is intended to provide a framework for structured discussions around the topic of sustainability and sustainable food systems in urban areas and to offer practical opportunities for implementation. Sustainability will also be considered in the construction and energy supply. Interdisciplinary collaboration between different disciplines is crucial to the successful implementation of the concept.

### **Intended Learning Outcomes:**

On successful completion of the module, participants are able to:

1. analyze the benefits and trade-offs of vertical farming systems and their role in sustainable food systems
2. understand the fundamentals of hydroponic and aquaponic systems;
3. create a concept for a Vertical Farming indoor system for the Sustainable Living Lab that integrates electrical engineering, artificial intelligence, and architecture on the Weihenstephan Campus;
4. develop a strategy for plant management and VF system management;
5. communicate their VF concept and design with understanding and evidence.

### **Teaching and Learning Methods:**

The module will consist of a Project (PT) where students will design a Vertical Farming system. The Module is an interactive, hands-on, and interdisciplinary teaching format based on experimental learning with a strong emphasis on group work and discussion in a "flipped classroom design". In this respect, it is a project, as students will design their own concept. Guest lectures and basic information on vertical farming systems, pest management, hydroponics, urban agriculture challenges, and public health and awareness will further support students. In addition, students will have the opportunity to attend the Urban Agriculture course lecture series. Participants in groups will have access to the high-tech Makerspace workshop and a start-up budget to develop their own concept. Students from all faculties can participate in the module. The project is offered in English so that international students can also be integrated.

### **Media:**

Presentations, scientific articles, group discussions, posters.

### **Reading List:**

Not specified

### **Responsible for Module:**

Egerer, Monika, Prof. Dr. [monika.egerer@tum.de](mailto:monika.egerer@tum.de)

### **Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4201: Vegetation Ecology and Geographical Information Systems | Vegetation Ecology and Geographical Information Systems

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

A written exam (Klausur) assesses whether the students understand the basic concepts of spatial data analysis as well as vegetation ecology with respect to manage landscapes, the students' ability to apply these techniques to certain problems in landscape management as well as the students' ability to precisely describe solutions to achieve certain results within a limited amount of time.

A voluntary Mid-Term assignment (presentation) assesses the students' ability to communicate management plans based on vegetation and habitat data. It will serve for grade improvement by 0,3 according to §6 (5) APSO.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Basic knowledge in GIS, remote sensing, for example learned by attending the module "Inventory Methods and GIS". Basic knowledge of plant species.

#### Content:

1. Advanced analysis and visualization of spatial data;
2. GIS based raster analysis;
3. GIS and satellite navigation;
3. Application of GIS in selected projects;
4. Introduction to the vegetation ecology, theory of plant distribution and of plantcommunities;
5. Methods of habitat mapping;
6. Habitat mapping in the field;
7. Field data analysis;
8. Management measures for management plans.



**Intended Learning Outcomes:**

At the end of the module students are able to:

- manage, analyze and visualize spatial data to solve problems related to landscape management;
- break down general problems in landscape management to tasks which can be solved by using a GIS;
- develop and communicate management plans based on vegetation and habitat data;
- ascertain and classify habitats.

**Teaching and Learning Methods:**

Theoretical explanation of certain topics followed by practical exercises using GIS software supported by screen animations.

Transfer of theoretical knowledge in lectures (vegetation ecology, habitat mapping), practical field work and presentation of proposals for landscape management measures.

**Media:**

GIS Software, PowerPoint Presentation

**Reading List:**

To be announced

**Responsible for Module:**

Döllerer, Martin; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

GIS (Landscape Management) (Vorlesung mit integrierten Übungen, 2 SWS)

Döllerer M

Vegetation Ecology (Vorlesung, 2 SWS)

Rojas Botero S, Döllerer M

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### **WZ0322: Ecological Colloquium: Scientific Foundations and Applications in Practice | Ökologisches Kolloquium: Wissenschaftliche Grundlagen und Anwendungen in der Praxis [SciTravels]**

*Overview of current research topics from local to global*

Version of module description: Gültig ab winterterm 2021/22

<b>Module Level:</b> Master	<b>Language:</b> German/English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 105	<b>Contact Hours:</b> 45

Number of credits may vary according to degree program. Please see Transcript of Records.

#### **Description of Examination Method:**

The module examination consists of a presentation (approx. 20 min.; 25% of the grade) and is supplemented by a written report (report of approx. 10 pages; 75% of the grade). In the presentation, students should demonstrate that they can independently research and professionally present their findings. Through the written report, students should demonstrate that they can communicate specialized knowledge about ecology, conservation, biodiversity, sustainability, and resource use in writing. Students should also demonstrate that they can evaluate current problems and research questions as well as transdisciplinary connections between research, planning, nature conservation and environmental protection, politics and society in this subject area.

#### **Repeat Examination:**

Next semester

#### **(Recommended) Prerequisites:**

Depending on the topic, basic knowledge of landscape- , vegetation- , wildlife- , forest- or soil ecology, as well as climatology and land use is necessary.

#### **Content:**

The module consists of a seminar and an exercise.

In the seminar, selected topics on ecology, nature conservation, biodiversity and sustainability research are presented in a series of guest lectures by internationally or nationally renowned scientists.

In the exercise, the results are presented and discussed by students in relation to the other contributions.

### **Intended Learning Outcomes:**

Upon successful completion of this module, students will be able to,

- understand sophisticated technical knowledge on diverse topics in the field of ecology, nature conservation and sustainable resource production and use;
- evaluate the quality of presentations by internationally or nationally recognized experts on selected topics in ecology, nature conservation, biodiversity and sustainability research according to methods and techniques, content and form;
- conduct research on the biography and professional focus of researchers, and
- present the results of their analysis and research efficiently and appropriately in a written report and to present and critically discuss them in a presentation.

Students will thus be able to critically evaluate current problems and research questions as well as transdisciplinary connections between research, planning and management, conservation and environmental protection, politics and society.

### **Teaching and Learning Methods:**

The students prepare for each lecture by reading the publications of the guest scientists and important related studies in the field. During the lecture, they assess how the subject matter is prepared and presented by the guest scientists. Based on the publications of the scholars and the lecture, the students analyze the methods and techniques used by the scientists to communicate their subject matter. By critically analyzing publications and lectures, students learn how established scientists present and communicate their scientific content to the public. By comparing and discussing several guest lectures as part of the exercise, students learn techniques for communicating specialized knowledge effectively both orally and in writing. The combination of presentations and written reports of students corresponds to the profile of requirements that graduates are often confronted with in the professional fields of ecosystem management, nature conservation, landscape planning and public relations.

### **Media:**

Seminar: PowerPoint presentations, script;

Exercise: original scientific articles, students' own presentations.

### **Reading List:**

Topic-specific literature for the seminar will be announced.

**Responsible for Module:**

Leonhardt, Sara Diana; Prof. Dr. rer. nat.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Weihenstephaner Kolloquium zur Angewandten Ökologie und Planung (Kolloquium, 2 SWS)  
Kollmann J, Häberle K, Geist J, Grams T, Kögel-Knabner I, Leonhardt S, Menzel A, Pauleit S,  
Schäfer H, Seidl R, Tellier A

Seminar Angewandte Ökologie und Planung (Seminar, 2 SWS)

Leonhardt S, Annighöfer P, Geist J, Grams T, Häberle K, Kögel-Knabner I, Kollmann J, Menzel A,  
Pauleit S, Seidl R, Tellier A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ1413: Wildlife Monitoring in Ecology: Concepts, Methods and Application | Wildlife Monitoring in Ecology: Concepts, Methods and Application

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The module grade is based on a written exam (90 min.) at the end of the module. The examination measures the student's ability to assess wildlife monitoring methods on the different fields of its applications and to evaluate the quality and application of monitoring data for management strategies. The learning success will be assessed by covering the knowledge and competence achieved in the main branches "Strategy and Planning", "Field Monitoring", "Genetic Monitoring" and "Statistics" in wildlife monitoring. In the written examination students demonstrate their theoretical and practical (e.g. application of methods) knowledge about wildlife monitoring by answering questions under time pressure and without helping material. For answering the questions, the students require their own wording.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

The module combines the theoretical background and the practical implementation of wildlife monitoring methods in ecology. The key aspects are:

1. Introduction and objectives of wildlife monitoring methods; terrestrial, aquatic, and genetic monitoring
2. Strategies and planning of wildlife monitoring
3. Field-monitoring methods of terrestrial and aquatic systems
4. Genetic-monitoring methods
5. Statistics of field-monitoring data

6. Statistics of genetic-monitoring data
7. Assessment of monitoring data
8. Application of monitoring data for management strategies

**Intended Learning Outcomes:**

After the course students are able to:  
understand the content and objectives of wildlife monitoring,  
design and plan research projects in wildlife biology with the focus on monitoring data acquisition,  
select appropriate field monitoring and genetic monitoring methods,  
understand the statistical principals of ecological and population genetic analyses  
apply R-statistic tools, population genetic software and geoinformatic tools  
interpret processed ecological and genetical parameters  
apply appropriate monitoring methods for specific management questions  
validate applied monitoring methods described in literature

**Teaching and Learning Methods:**

Learning contents will be conveyed during a seminar covering theoretical and applied background information, practical exercises in field monitoring, practical exercises in genetic analyses, practical exercises in statistics (R-package) and practical exercises in GIS (ArcGIS) focused on wildlife monitoring. Group discussions for developing monitoring methods as well as for assessing methods, data and implementation strategies, apply the gained knowledge. The content of the seminar and practical exercises is based on international research projects. Real-world data provide the structure for the course.

**Media:**

lecture notes, flip-chart/board, handouts, real world raw data, software tools

**Reading List:**

Silvy 2012 The Wildlife Techniques Manual. Sutherland 2006 Ecological Census Techniques, Hartl and Clark 2007 Principals of Population genetics. Gardner 2017 Statistics for Ecologists Using R and Excel (Data in the Wild). Sinclair et al. 2006, Wildlife Ecology, Conservation, and Management

**Responsible for Module:**

Prof. Dr. Ralph Kühn - Lehrstuhl für Zoologie Hans-Carl-von-Carlowitz-Platz 2, 85354 Freising;,  
08161/71-4608; kuehn@wzw.tum.de

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ2735: World Soil Resources | World Soil Resources

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 80	<b>Contact Hours:</b> 70

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

In an oral exam of 30 minutes duration, students demonstrate in a scientific discussion by answering questions without helping material their fundamental understanding of the soils of the world in relation to other ecological factors, and they remember the soils of the field course as well as the methods of surveying and classifying soils in the field. In a pass/fail exam (laboratory assignment) in the field of 10 minutes duration, they prove their ability to survey and classify soils of various landscapes and environmental settings. The understanding of soils, as achieved in the module "Introduction to soil science" is implicitly part of the oral exam.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

The successful participation at the module "Introduction to Soil Science" (which is given in the first half of the summer semester) is required.

#### Content:

- Soils of the world
- Chemical, biological and physical properties of soils
- Genesis of soils as the result of -soil-forming processes
- Soil survey
- Soil classification according to the international system
- Soil interpretation.

#### Intended Learning Outcomes:

The students are able to apply their knowledge of soils, as achieved in the module "Introduction to Soil Science", to all soils of the world. The students understand the characteristics of the soils of the world, the pattern of their geographical distribution, their genesis, their ecological potential and

the threats to their functions. The students are able to survey a soil profile, to detect the genesis of the surveyed soil and to classify it according to the international soil classification system. They are able to evaluate the possibilities and risks of soil management. They can assess the relationship between the soil and its environmental setting.

**Teaching and Learning Methods:**

The lecture gives an overview of all soils of the world. The field course (several days) presents soils in a landscape outside southern Bavaria. The students are trained in the methodological skills of soil survey, soil classification and soil interpretation.

**Media:**

Lecture: presentation notes. Field Assessment: spade, auger, knife, colour charts.

**Reading List:**

FAO Guidelines for Soil Description. Prepared by Jahn, Blume, Asio, Spaargaren, Schad, 2006.  
IUSS Working Group WRB: World Reference Base for Soil Resources 2014. Update 2015.  
Prepared by Schad, van Huyssteen, Micheli. FAO World Soil Resources Reports 106.

**Responsible for Module:**

Schad, Peter; Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

World Soil Resources: Lecture (Vorlesung, 2 SWS)  
Schad P

Bodenansprache und Bodenklassifikation nach internationalen Standards (Übung, 2,8 SWS)  
Schad P

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).



## Module Description

### WZ4198: Wildlife Management and Wildlife-Human Interactions | Wildlife Management and Wildlife-Human Interactions

Version of module description: Gültig ab winterterm 2015/16

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

Written assignment (ca. 15 pages) requiring review of literature, synthesis and integration of key concepts and findings from the literature to develop a coherent research proposal that clearly demonstrates knowledge in the field of species management and conservation strategies and of human dimensions as a research and applied field of study. Expected to read in advance where possible assigned readings so to be prepared for course lectures.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

This lecture combines contents of Wildlife Management and Wildlife Human Interactions. The key aspects are: 1) Principles of Wildlife Management & Wildlife Science, 2) Planning tools, 3) Case study: Strategic planning, 4) Conflicting views in WMT with case studies, 5) Basic Concepts in Ecology, 6) Reintroductions studies, 7) Global threats to Conservation, 8) Nature of human dimensions (HD) from a research perspective through various examples 9) Nature of various wildlife-human interactions from different perspectives, 10) Nature of public involvement and HD as an applied approach 11) Types of conflict, levels of planning and how to work with people toward solutions, 12) Understanding decision-making processes.

#### Intended Learning Outcomes:

After the course students are able to: understand important ecological concepts in wildlife management; understand the importance of the human dimension in wildlife management; analyse a conservation strategy for a species; apply wildlife management plans; evaluate species

and protected area management plans; understand the importance and nature of objectivity in conducting research and being a human dimension researcher; develop the ability to synthesize relevant literature pertinent to a research problem; organize ideas effectively and communicate these in a well-organized and developed written proposal.

**Teaching and Learning Methods:**

Lecture, video, group exercises, discussions

**Media:**

lecture notes, flip-chart/board, hand-outs, additional reading material

**Reading List:**

Sinclair et al. 2006, Wildlife Ecology, Conservation, and Management, ISBN 1-4051-0737-5 ;  
Krausman 2002, Wildlife Management, ISBN 0-1328-0850-1; Pullin 2002, Conservation Biology,  
ISBN 0-521-64482-8

**Responsible for Module:**

Kühn, Ralph; Apl. Prof. Dr. agr. habil.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Wildlife-Human Interactions (Seminar, 2 SWS)

Kühn R [L], Bath A

Wildlife Management (Vorlesung, 2 SWS)

Kühn R [L], Rödl T

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ4207: Waste and Waste Water Treatment | Waste and Waste Water Treatment

Version of module description: Gültig ab winterterm 2020/21

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 90	<b>Contact Hours:</b> 60

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The written exam (90 min.) consists of general questions and simple calculations. In the written exam students demonstrate their theoretical knowledge of waste and wastewater treatment. The answers require wording but also single choice tests as well as calculations. Only the use of a calculator is allowed (closed book exam).

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Interest and basic knowledge in chemistry, physics, biology and preferably in environmental, chemical, civil or process engineering. However, the level of the course is adapted to the known broad spectrum of background knowledge allowing also students to follow you hold a bachelor in a totally different realm.

#### Content:

Waste management:

1. Basics of waste management (What is waste, waste amounts, history and future of waste, waste legislation);
2. Avoidance and recovery of waste and waste management concepts;
3. Waste disposal (legal aspects of landfill, processes in above-ground landfill, above-ground landfill technologies, underground disposal sites);
4. Biological treatment (legal aspects, composting, fermentation, mechanical biological treatment, sewage sludge, substitute fuels);

5. Thermal treatment (legal aspect, thermal processes, equipment, power generation, alternative thermal processes, hazardous waste treatment).

Wastewater treatment:

1. Water treatment & management concepts; overview wastewater treatment steps
2. Wastewater characteristics & discharge limits
3. Mechanical wastewater treatment
4. Fundamentals in bioprocess technology; stoichiometry of biological reactions; kinetics of biological reactions; aeration
5. Biological wastewater treatment
6. Sewage sludge treatment
7. Field trip Garching wastewater treatment plant (optional)

**Intended Learning Outcomes:**

At the end of the module, students are able to:

1. Understand the necessity and objectives of waste management.
2. Understand the most important processes and technologies for waste treatment.
3. Decide which treatment method is valid for which type of waste.
4. Understand sources and types of emissions arising from waste treatment and measures for emission reduction
  
8. Understand the necessity and the feasibility of wastewater treatment especially in treating municipal wastewater.
9. Classify the single steps of eliminating wastewater compounds, such as coarse material, organic and inorganic pollutants.
10. Recall important treatment processes and their requirements.
11. Assess pros and cons of different treatment technologies.

**Teaching and Learning Methods:**

The knowledge in the field of waste management is imparted during lectures. Theoretical background is given and discussed at practical examples of existing waste management infrastructure (Collection Systems, Landfills, Treatment Facilities, etc.)

The content of the lecture are taught through practical examples. By means of example tasks in the lecture, possible solutions are discussed and exemplified calculations are performed. An optional field trip to the Garching wastewater treatment plant at the end of the course allows connecting theoretical knowledge with practical application and gives a final platform for questions.

**Media:**

The course is mainly taught by PowerPoint presentation and supported by notices on the black board. The lecture notes are uploaded to Moodle. It is ensured that further readings are available in the university library either for download or as hardcopy in an adequate number.

**Reading List:**

Waste Management:

Bilitewski, B., Härdtle, G., Marek, K.; Weissbach, A.; Boedekker, A.: Waste Management, Springer-Verlag Berlin Heidelberg, ISBN-10: 9783642082122

Waste Management: [https://issuu.com/tkverlag/docs/waste\\_management\\_4](https://issuu.com/tkverlag/docs/waste_management_4)

Evans, G. (Ed): Biowaste and Biological Waste Treatment, ISBN: 978-1-902916-08-8

Wastewater Treatment:

la Cour Jansen, J., Arvin, E., Henze, M., Harremoes, P., 2019. Wastewater treatment - Biological and chemical Processes. Polyteknisk Boghandel og Forlag, Lyngby.

Tchobanoglous, G., Burton, F.L., Tsuchihashi, R., Stensel, H.D., 2013. Wastewater Engineering: Treatment and Resource Recovery. McGraw-Hill, Boston.

Wiechmann, B., Dienemann, C., Kabbe, C., Brandt, S., Vogel, I., Roskosch, A., 2013. Sewage sludge management in Germany. Umweltbundesamt, Bonn.

**Responsible for Module:**

Konrad Koch

**Courses (Type of course, Weekly hours per semester), Instructor:**

Waste Management (Vorlesung, 2 SWS)

Franke M

Waste Water Treatment (Vorlesung, 2 SWS)

Koch K

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### WZ6432: Wildlife and Conservation Biology | Wildlife and Conservation Biology

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 75	<b>Contact Hours:</b> 75

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination consists of a 60 min. written exam (Klausur). The examination means to measure the student's ability to assess anthropogenic influence on Biodiversity, to explain factors affecting Wildlife, to recall methods in Conservation Biology and applied Genetics and to evaluate Conservation Biology concepts. In the written examination students demonstrate by answering questions under time pressure and without helping material their theoretical and practical knowledge about Wildlife and Conservation Biology. For answering the questions, the students require their own wording. In the practical exercise the students present a case study and design a own research project proposal to practice their scientific communication skills and to transfer the theoretical knowledge to practical projects. Gradings from the Klausur and the Project work are weighed in the ratio 7:3.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Interest in Wildlife Conservation Biology and Nature Conservation. Basic background in Biology

#### Content:

The module combines the theoretical background and the practical implementation of Wildlife Conservation Biology, Conservation Genetics and Nature Conservation. The key aspects are:

1. Scope and tasks of Conservation Biology and applied Genetics
2. Biodiversity, Ecosystems, Ecosystem Services and Green Banking
3. Factors affecting terrestrial and aquatic Biodiversity
4. Methods in Wildlife Conservation Biology and applied Genetics
5. Conservation Biology concepts and strategies for natural population using international examples
6. Case studies and applied Nature Conservation, from theory to praxis

### **Intended Learning Outcomes:**

At the end of the module students understand the importance of Biodiversity of terrestrial resources and its interaction with human dimensions. They are able to apply and to evaluate Conservation Biology methods and strategies based upon an interdisciplinary understanding of species biology, conservation biology and applied genetics. In addition, students are able to integrate interdisciplinary knowledge into applied conservation management on a regional and international scale. They have an overview of applied interdisciplinary Nature Conservation management and are able to evaluate sustainable resource management strategies.

### **Teaching and Learning Methods:**

The module combines the lecture "Wildlife and Conservation Biology" with an accompanying practical exercise " Case Studies in Nature Conservation". The lecture contents will be presented using lectures based on power-point presentation and group work in order to combine activating teaching methods with classic presentation techniques. In the accompanying practical exercise, the students will apply the gained theoretical knowledge by conducting case studies (research programs), and presenting own concepts of research project in various content in the field of Wildlife Conservation Biology and Nature Conservation. Here the students learn to independently screen the respective literature in this field and learn methods in science communication.

### **Media:**

Form of presentation: lecture, case study, movie segment and practical exercise  
material: lecture notes, flip-chart/board, plus different materials for methodological/technical training

### **Reading List:**

1. Primack (2014) Essentials of Conservation Biology
2. Frankham (2010) Introduction to Conservation Genetics
3. Sutherland (2009) Conservation Science and Action

### **Responsible for Module:**

Kühn, Ralph; Apl. Prof. Dr. agr. habil.

### **Courses (Type of course, Weekly hours per semester), Instructor:**

Conservation Biology and Applied Genetics (Vorlesung, 2 SWS)

Kühn R

Case Studies in Nature Conservation (Übung, 3 SWS)

Kühn R, Stoeckle B

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Module Description

### LS50016: Yale Field Trip with Preparatory Seminar | Yale Field Trip with Preparatory Seminar [Yale]

Version of module description: Gültig ab summerterm 2023

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> summer semester
<b>Credits:*</b> 5	<b>Total Hours:</b> 150	<b>Self-study Hours:</b> 35	<b>Contact Hours:</b> 115

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The examination of the module is in form of a presentation (15 Minutes) during the preparatory seminar (voluntary midterm examination as course work; successful performance might improve the exam grade by 0.3; the presentation demonstrates that the students can independently familiarize themselves with and analyze one of the topics dealt with during the field trip) and a field trip report (5-10 pages), which has two parts. Part 1 presents the contents of the field trip. The students are assigned field trip topics (in groups), which they prepare scientifically in text form. In this way, the students prove that they can recognise the most important teaching contents from the presented field trip topics and prepare them scientifically. Part 2 consists of a reflection on the field trip topic against the background of the knowledge and skills acquired during the course of study and leads to a comparative analysis of the problem perceptions, solution, research and management approaches in North America and Germany, as presented by the American participants of the field trip. No repeat date is offered for the mid-term performance.

#### Repeat Examination:

#### (Recommended) Prerequisites:

WZ2706 Waldbau (German)

WZ4161 Forest Management (English)

Very good English skills

#### Content:

A joint field trip of approx. 2 weeks is at the centre of the module, which either takes place in Central Europe or North America. Students and lecturers from Yale University and TUM take part in the field trip. The field trips focus on

1. forest research and forest ecology (diversity and dynamics of forest ecosystems)



2. forestry and renewable resources (silvicultural methods, timber utilisation, nature conservation, society)

3. environmental policy (national park management, spatial planning).

The respective focus varies slightly depending on the field trip destination.

A preparatory seminar is held for the field trip in which the students are prepared for the field trip.

### **Intended Learning Outcomes:**

The students are able to analyse the presented field trip topics against the background of

- forest science (especially different silvicultural approaches),
- forest ecology theories (especially the concept of potentially natural vegetation vs. natural disturbance regimes; different protection concepts like wilderness) and
- research approaches.

The students recognise how

- different historical developments (fundamental change of forest cover and forest structure in Middle Europe since the medieval period; minor influence of Native Americans on the ecosystems until the arrival of the European settlers) and
- different political systems and conditions (especially forest ownership, influence of nature protection organizations, and spatial planning systems) in Germany and North America influence the management of forest ecosystems.

### **Teaching and Learning Methods:**

In the preparatory seminar, the students give presentations on topics relevant to the field trip in order to prepare for the field trip in terms of language and content. These presentations are also the basis for the field trip reports. During the field trip, local stakeholders present their perceptions of problems and approaches to solutions for the diverse challenges of forest management and related topics such as environmental and conservation policy. Inputs from the participating TUM and Yale lecturers and joint reflections with the students under the guidance of the lecturers (daily debriefings) serve to deepen topics and open questions.

### **Media:**

Seminar and field trip

### **Reading List:**

/

### **Responsible for Module:**

Annighöfer, Peter, Prof. Dr. peter.annighoefer@tum.de <https://www3.ls.tum.de/fafsys>

### **Courses (Type of course, Weekly hours per semester), Instructor:**

YALE EXKURSION (Exkursion, 7 SWS)

Annighöfer P, Suda M, Mathes T, Pukall K, Wadenspanner A

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Course Achievement | Studienleistungen

### Module Description

#### WZ4061: Internship | Internship

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 12	<b>Total Hours:</b> 360	<b>Self-study Hours:</b> 360	<b>Contact Hours:</b> 0

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

After completion of the 8 weeks internship, the students have to submit an internship report (a 10 pages detailed report) and a confirmation of completion from the employer, in which the employer specify the duration of the internship (including potential time of absence).

With the report, the students demonstrate that they are able to review critically the operational structures and procedures, to develop independently project proposals, to evaluate subject specific tasks of principals and to reflect their personal competences for the practical work. They show additionally, that they can connect the different science issues of the Master's program with the practical application in the job.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

Knowledge in the field of sustainable resource management according to the science and management related outcomes of the Master's Program.

#### Content:

The internship delivers insights into various fields of business activities concerning sustainable resource management and into specific operation procedures of enterprises or organizations. It provides the possibility to explore the career options and to contact potential employers.

The students have to do their internship outside of enterprises of their own or of relatives with the minimum period of 8 subsequent weeks (12 ECTS credits).

The students have to look themselves for an internship and to plan it without getting in conflict with the lecture time. The recommended period for the internship is the lecture free time between the 2nd and 3rd semester (August – October).

The internship can be split into two parts with a minimum duration of one month each. It is possible to do the internship in various organizations, however the minimum duration of one month each has to be kept.

The internship office can guide the selection of potential options. Those enterprises or organizations are recommended which are suitable as potential employers.

#### Organizational hints:

The processing of the internship has to be agreed with the internship office Weihestephan.

Contact the office in time, i.e. several weeks before starting. See: <https://www.praktikantenamt-weihestephan.bayern.de/237314/index.php>

Before starting the internship, an internship contract has to be concluded. It has to cover 8 weeks, or if you split, minimum 4 subsequent weeks has to be done in the same enterprise.

The internship may be completed part-time for at least 20 hours per week.

The total number of hours of 320 h must be completed in a part-time internship with correspondingly longer contract period.

If the internship is split up, the minimum duration per internship company is: 4 weeks x 40 h = 160 h, which must be completed at least per internship company. In the case of a part-time internship e. g. with 20 hours, at least 8 weeks must be completed per internship company.

#### **Intended Learning Outcomes:**

After the successful completion of the internship, the students are able to link theory and practice, especially

- to apply their scientific knowledge and management competences acquired in the master's program into the practice in operational, strategic or scientific fields,
- to analyze and evaluate the functions and tasks of executive officers and managers in the area of sustainable resource management,
- to analyze and evaluate the operational, strategic and research related structures and procedures, and
- to develop independently project proposals.

Additionally, they are able to apply their social skills received, especially

- to integrate confidently in enterprises or organizations by performing a new job and
- to communicate with colleagues, supervisors and principals of enterprises or organizations in an adequate mode.

#### **Teaching and Learning Methods:**

The students take part in the daily routine in the enterprises or organizations during the internship.

According to the respective internship job, learning methods are applied like independently working on different tasks in the enterprise or organization, training of practical competences during the job execution, cooperating with the colleagues, supervisors and principals, implementing of tasks over a specific period, observing the mode of operation of principals and colleagues, writing documentation of own findings and experiences etc.

**Media:**

According to the internship job.

**Reading List:**

According to the internship job.

**Responsible for Module:**

Jositz-Pritscher, Ingrid, Dr. Praktikantenamt Weihenstephan [www.praktikantenamt-weihenstephan.de](http://www.praktikantenamt-weihenstephan.de) Alte Akademie 1, 85354 Freising, 08161 / 71-3710 [ingrid.jositz-pritscher@paw.bayern.de](mailto:ingrid.jositz-pritscher@paw.bayern.de)

**Courses (Type of course, Weekly hours per semester), Instructor:**

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Master's Thesis | Master's Thesis

### Module Description

#### WZ2754: Master's Thesis | Master's Thesis

Version of module description: Gültig ab winterterm 2022/23

<b>Module Level:</b> Master	<b>Language:</b> English	<b>Duration:</b> one semester	<b>Frequency:</b> winter/summer semester
<b>Credits:*</b> 30	<b>Total Hours:</b> 900	<b>Self-study Hours:</b> 890	<b>Contact Hours:</b> 10

Number of credits may vary according to degree program. Please see Transcript of Records.

#### Description of Examination Method:

The assessment in this module is based on the successful completion of the Master's Thesis (Research paper of around 100 pages depending on the topic) including the starting Master's Thesis Proposal (Report as coursework, 6 pages). In order to promote the competences required for the Master's thesis, the proposal should be submitted before the registration of the thesis.

#### Repeat Examination:

Next semester

#### (Recommended) Prerequisites:

None

#### Content:

The student selects a topic of his/her own choice on which he/she will work according to scientific methods. A combination of the master's thesis and an internship is possible if the rules for internships are kept. It would be ideal if student's master's thesis is based on the internship experience. Discussing the topic and the methods with a guiding professor or lecturer before starting the master's thesis is absolutely necessary. Therefore, for all students a starting seminar "Master's Thesis Proposal" is offered to guide them 1) theoretically in structuring their 6 months' work and 2) in practice in writing a proposal which outlines their thesis topic including the state of knowledge, the research gaps, the goal of the Master's Thesis, the planned methods, and a working and a financial plan. It also includes training on literacy strategy.

The thesis must be written under supervision of a tutor who must be a lecturer of TUM and has the approval to conduct exams at TUM. It is recommended to select a lecturer of the "Sustainable Resource Management" Program. The tutor will in the end evaluate and mark the master's thesis.

The thesis can be done at TUM, outside the university, abroad or in the student's home-country, with previous consent of the tutor. Students can start writing their thesis in the fourth semester of the Master's Program

**Intended Learning Outcomes:**

After finishing the Master's Thesis module, the students have the ability to work independently and adapt to a problem in a limited period of time. The theoretical and practical training received in the module enables our students to investigate defined scientific questions on their own, with support from an experienced supervisor. They can analyze and evaluate state-of-the art knowledge, identify a research gap and work on derived specific research questions. To answer these questions and find solutions, they can subsequently plan and conduct experiments / study designs addressing the scientific question with appropriate research methods and techniques. The students know the most important facts and theories related to their research topic and can critically discuss and evaluate their own results in relation to the state-of-the art knowledge. In conducting their art of science, they follow the rules of good scientific practice.

**Teaching and Learning Methods:**

The learning activities cover theoretical and practical training by a scientific supervisor of the host institution. The master student is guided in literature search, scientific reading, solving problems, practicing, designing an experiment, creating a scientific proposal and a scientific thesis, constructive criticising their own work and revising it on basis of feedback, all parts under time constraints. Therefore, the learning methods are an introduction seminar to support a structured procedure and peer instructions for their individual work.

**Media:**

Dependent on the topic of the thesis; e.g. specialized literature, software

**Reading List:**

Dependent on the topic of the thesis

**Responsible for Module:**

Weber-Blaschke, Gabriele; Apl. Prof. Dr. rer. silv.

**Courses (Type of course, Weekly hours per semester), Instructor:**

Master's Thesis Proposal (Seminar, 1 SWS)

Weber-Blaschke G

For further information in this module, please click [campus.tum.de](https://campus.tum.de) or [here](#).

## Alphabetical Index

---

| Soils and Soil Management 345

## A

---

<b>[WZ0246] Advanced Concepts and Methods in Urban Ecosystems  </b> Advanced Concepts and Methods in Urban Ecosystems	387 - 390
<b>[WZ2757] Advanced Environmental and Natural Resource Economics  </b> Advanced Environmental and Natural Resource Economics	395 - 396
<b>[CS0126] Advanced Seminar in Circular Economy and Sustainability Management  </b> Advanced Seminar in Circular Economy and Sustainability Management [ASCESM]	385 - 386
<b>[WIB14002] Advanced Seminar Life Sciences, Management &amp; Policy: Sustainable Entrepreneurship - Theoretical Foundations  </b> Advanced Seminar Life Sciences, Management & Policy: Sustainable Entrepreneurship - Theoretical Foundations	324 - 326
<b>[SG810003] Advanced Statistics  </b> Advanced Statistics	183 - 184
<b>[WZ2721] Agriculture Raw Materials and their Utilization  </b> Agriculture Raw Materials and their Utilization [ARM&U]	329 - 330
<b>[WZ2721] Agriculture Raw Materials and their Utilization  </b> Agriculture Raw Materials and their Utilization [ARM&U]	391 - 392
<b>[WZ2736] Analytical Characterization of Soil Resources  </b> Analytical Characterization of Soil Resources	351 - 352
<b>[WZ2736] Analytical Characterization of Soil Resources  </b> Analytical Characterization of Soil Resources	393 - 394
<b>[BGU38019] Anaerobic Processes and Energy Recovery  </b> Anaerobtechnik und Energierückgewinnung	383 - 384
<b>[SZ0118] Arabic A1.1  </b> Arabisch A1.1	33 - 35
<b>[CLA90211] Art and Politics  </b> Kunst und Politik	291 - 292

## B

---

<b>[IN2124] Basic Mathematical Methods for Imaging and Visualization  </b> Basic Mathematical Methods for Imaging and Visualization	441 - 443
<b>[CLA30257] Big Band  </b> Big Band	280 - 281

## C

---

<b>Carl von Linde-Akademie</b>   Carl von Linde-Akademie	226
<b>[BGU62039] Case Studies of Sustainable Urban Developments and Infrastructure</b>   Fallstudien nachhaltiger Quartiers-, Stadt- und Infrastrukturentwicklungen [FNQSI]	427 - 430
<b>[SZ0209] Chinese A1.1</b>   Chinesisch A1.1	44 - 45
<b>[SZ0211] Chinese A2.1</b>   Chinesisch A2.1	46 - 47
<b>[WZ1590] Climate Change Economics</b>   Climate Change Economics	400 - 402
<b>[WZ2730] Climate Change - Science, Impacts and Adaptation, Mitigation</b>   Climate Change - Science, Impacts and Adaptation, Mitigation	343 - 344
<b>[WZ2730] Climate Change - Science, Impacts and Adaptation, Mitigation</b>   Climate Change - Science, Impacts and Adaptation, Mitigation	403 - 404
<b>Climate, Air and Water</b>   Climate, Air and Water	337
<b>[CLA10555] Communication and Facilitation in Project Teams</b>   Communication and Facilitation in Project Teams	238 - 239
<b>[CLA30267] Communication and Presentation</b>   Kommunikation und Präsentation	226 - 227
<b>[CLA20267] Communication and Presentation</b>   Kommunikation und Präsentation	256 - 257
<b>[POL40300] Computational Methods</b>   Computational Methods	185 - 186
<b>[CLA20231] Concepts of Human Being</b>   Mensch und Menschenbilder	254 - 255
<b>[CLA11313] Conflict Management and Conducting Discussions</b>   Konfliktmanagement und Gesprächsführung	248 - 249
<b>[WI001190] Cooperation and Integration in Agribusiness</b>   Cooperation and Integration in Agribusiness	377 - 379
<b>[WI001190] Cooperation and Integration in Agribusiness</b>   Cooperation and Integration in Agribusiness	397 - 399
<b>Course Achievement</b>   Studienleistungen	562
<b>[WZ0812] Cultural Competence: Choir and Orchestra</b>   Kulturelle Kompetenz: Chor- und Orchester	293 - 294

## D

---

<b>[CLA20705] Diversity and Conflict Management</b>   Diversität und Konfliktmanagement	264 - 265
<b>[SZ1601] Dutch A1</b>   Niederländisch A1	121 - 122
<b>[SZ1602] Dutch A2</b>   Niederländisch A2	123 - 124



# E

---

<b>[WZ0322] Ecological Colloquium: Scientific Foundations and Applications in Practice</b>   Ökologisches Kolloquium: Wissenschaftliche Grundlagen und Anwendungen in der Praxis [SciTravels]	546 - 548
<b>[WI001228] Economics of Environmental and Climate Policy</b>   Economics of Environmental and Climate Policy	24 - 25
<b>[WI001204] Economics of Water Use, Regulation and Markets</b>   Economics of Water Use, Regulation and Markets	415 - 417
<b>[CLA10813] Economic Thinking: Economics</b>   Volkswirtschaftlich Denken Elective Courses   Wahlmodule	242 - 243 295
<b>[WZ2724] Emission Control in Land-Use and Animal Husbandry</b>   Emission Control in Land-Use and Animal Husbandry	353 - 354
<b>[WZ2724] Emission Control in Land-Use and Animal Husbandry</b>   Emission Control in Land-Use and Animal Husbandry	423 - 424
<b>[POL62200] Energy Transformation</b>   Energy Transformation	407 - 409
<b>[BGU38023] Engineered Natural Treatment Systems</b>   Natürliche Aufbereitungsverfahren	470 - 471
<b>[SZ0454] English - Basic English for Scientific Purposes B2</b>   Englisch - Basic English for Scientific Purposes B2	199 - 200
<b>[SZ04043] English - English in action - What is Art? from B2</b>   Englisch - English in action - What is Art? ab B2	193 - 194
<b>[SZ0471] English - Intensive Thesis Writers' Workshop C2</b>   Englisch - Intensive Thesis Writers' Workshop C2	201 - 202
<b>[SZ0453] English - Scientific Presentation and Writing C2</b>   Englisch - Scientific Presentation and Writing C2	197 - 198
<b>[SZ0406] English - Writing Academic Research Papers C2</b>   Englisch - Writing Academic Research Papers C2	195 - 196
<b>[IN9017] Entrepreneurship</b>   Existenzgründung	191 - 192
<b>[WZ1876] Entrepreneurship in the Agricultural and Horticultural Industry</b>   Entrepreneurship in the Agricultural and Horticultural Industry	368 - 370
<b>[WZ1876] Entrepreneurship in the Agricultural and Horticultural Industry</b>   Entrepreneurship in der Agrar- und Gartenbauwirtschaft	420 - 422
<b>[WI000286] Environmental and Natural Resource Economics</b>   Environmental and Natural Resource Economics	413 - 414
<b>[WZ2732] Environmental Monitoring and Data Analysis</b>   Environmental Monitoring and Data Analysis	341 - 342
<b>[WZ2732] Environmental Monitoring and Data Analysis</b>   Environmental Monitoring and Data Analysis	425 - 426
<b>[CLA20230] Ethics and Responsibility</b>   Ethik und Verantwortung	187 - 188

<b>[SOT86700] EuroTeQ Collider - Leave no Waste Behind (Master)   EuroTeQ Collider - Leave no Waste Behind (Master)</b>	410 - 412
<b>[WZ0228] Exercises in Precision Agriculture and Plant Phenotyping   Exercises in Precision Agriculture and Plant Phenotyping</b>	418 - 419
<b>[LS20022] Experimental Methods in Soil and Plant Hydrology   Experimental Methods in Soil and Plant Hydrology</b>	405 - 406

## F

---

<b>[WZ4189] Fisheries and Aquatic Conservation   Fisheries and Aquatic Conservation</b>	310 - 312
<b>[WZ4189] Fisheries and Aquatic Conservation   Fisheries and Aquatic Conservation</b>	438 - 440
<b>[WZ4098] Forestry Raw Materials and their Utilization   Forestry Raw Materials and their Utilization</b>	331 - 332
<b>[WZ4098] Forestry Raw Materials and their Utilization   Forestry Raw Materials and their Utilization</b>	434 - 435
<b>[WZ2716] Forest Growth and Forest Operations   Forest Growth and Forest Operations</b>	297 - 299
<b>[WZ2716] Forest Growth and Forest Operations   Forest Growth and Forest Operations</b>	431 - 433
<b>[WZ4161] Forest Management   Forest Management</b>	295 - 296
<b>[WZ4161] Forest Management   Forest Management</b>	436 - 437
<b>Free Elective Modules   Free Elective Modules</b>	383
<b>[SZ0501] French A1.1   Französisch A1.1</b>	75 - 76
<b>[SZ0502] French A1.2   Französisch A1.2</b>	77 - 78
<b>[SZ0503] French A2.1   Französisch A2.1</b>	79 - 81
<b>[SZ0504] French A2.2   Französisch A2.2</b>	82 - 83
<b>[SZ0505] French B1.1   Französisch B1.1</b>	84 - 85
<b>[SZ05061] French B1.2   Französisch B1.2</b>	86 - 87
<b>[SZ0514] French B2 - Communication Course   Französisch B2 - Cours de conversation</b>	88 - 90
<b>[SZ0523] French C1 - French in Business   Französisch C1 - Le français des affaires</b>	94 - 96
<b>[SZ0515] French C1 - Upper Conversation Course   Französisch C1 - Cours de conversation supérieure</b>	91 - 93
<b>[CLA21008] Fundamental Principles of Globalisation   Grundlagen der Globalisierungsforschung</b>	272 - 273

# G

---

<b>[CLA20910] Gender Competence as Core Qualification</b>   Genderkompetenz als Schlüsselqualifikation	268 - 269
<b>[WZ2714] General Education Subject</b>   General Education Subject	33
<b>Generic Competences</b>   Überfachliche Kompetenzen	183
<b>[WZ2717] Genetic Resources Management and Forest Protection</b>   Genetic Resources Management and Forest Protection	300 - 302
<b>[WZ2717] Genetic Resources Management and Forest Protection</b>   Genetic Resources Management and Forest Protection	444 - 446
<b>[SZ0337] German as a Foreign Language A1.1</b>   Deutsch als Fremdsprache A1.1	60 - 61
<b>[SZ0321] German as a Foreign Language A1.1 plus A1.2</b>   Deutsch als Fremdsprache A1.1 plus A1.2	52 - 53
<b>[SZ0338] German as a Foreign Language A1.2</b>   Deutsch als Fremdsprache A1.2	62 - 63
<b>[SZ0303] German as a Foreign Language A2.1</b>   Deutsch als Fremdsprache A2.1	48 - 49
<b>[SZ0322] German as a Foreign Language A2.1 plus A2.2</b>   Deutsch als Fremdsprache A2.1 plus A2.2	54 - 56
<b>[SZ0304] German as a Foreign Language A2.2</b>   Deutsch als Fremdsprache A2.2	50 - 51
<b>[SZ0350] German as a Foreign Language B1.1</b>   Deutsch als Fremdsprache B1.1	70 - 71
<b>[SZ0323] German as a Foreign Language B1.1 plus B1.2</b>   Deutsch als Fremdsprache B1.1 plus B1.2	57 - 59
<b>[SZ0351] German as a Foreign Language B1.2</b>   Deutsch als Fremdsprache B1.2	72 - 74
<b>[SZ0339] German as a Foreign Language B2.1</b>   Deutsch als Fremdsprache B2.1	64 - 65
<b>[SZ0340] German as a Foreign Language B2.2</b>   Deutsch als Fremdsprache B2.2	66 - 67
<b>[SZ0341] German as a Foreign Language C1.1</b>   Deutsch als Fremdsprache C1.1	68 - 69
<b>[CLA10512] Getting More Effective - on My Own and in a Team</b>   Effektiver werden - allein und im Team	236 - 237
<b>[CLA20710] Global Diversity Training</b>   Global Diversity Training	266 - 267
<b>[POL65101] Global Health (MSc.)</b>   Global Health (MSc.)	203 - 204

# H

---

<b>[SZ1304] Hebrew A1.1   Hebräisch A1.1</b>	109 - 110
<b>[SZ1305] Hebrew A1.2   Hebräisch A1.2</b>	111 - 112
<b>[CLA11123] How to Produce Your Own Videos   Videos selber machen</b>	230 - 231
<b>[WZ1545] Human Resource Management in Agriculture and Related Industries   Human Resource Management in Agriculture and Related Industries</b>	447 - 448
<b>[WZ2731] Hydrometeorology and Management of Water Resources   Hydrometeorology and Management of Water Resources</b>	337 - 338
<b>[WZ2731] Hydrometeorology and Management of Water Resources   Hydrometeorology and Management of Water Resources</b>	449 - 450

# I

---

<b>[EI70860] Integration of Renewable Energies   Integration of Renewable Energies [IRE]</b>	335 - 336
<b>[EI70860] Integration of Renewable Energies   Integration of Renewable Energies [IRE]</b>	451 - 452
<b>[SZ03031] Intensive Course German as a Foreign Language A2.1   Blockkurs Deutsch als Fremdsprache A2.1</b>	36 - 37
<b>[SZ03041] Intensive Course German as a Foreign Language A2.2   Blockkurs Deutsch als Fremdsprache A2.2</b>	38 - 39
<b>[SZ03061] Intensive Course German as a Foreign Language B1.2   Blockkurs Deutsch als Fremdsprache B1.2</b>	40 - 41
<b>[SZ08011] Intensive Course Portuguese A1   Blockkurs Portugiesisch A1</b>	42
<b>[SZ08061] Intensive Course Portuguese A2.1   Blockkurs Portugiesisch A2.1</b>	43
<b>[CLA20424] Intercultural Encounters   Interkulturelle Begegnungen</b>	258 - 259
<b>[CLA11317] Interdisciplinary Lecture Series Environment: Politics and Society   Ringvorlesung Umwelt: Politik und Gesellschaft</b>	250 - 251
<b>[EI7467] Interdisciplinary Project Internship Concept Development of a Renewable Energy System in a Developing Country   Interdisciplinary Project Internship Concept Development of a Renewable Energy System in a Developing Country [ProRESDC]</b>	453 - 455
<b>[LS50000] International Climate Strategies / UNFCCC   International Climate Strategies / UNFCCC</b>	456 - 458
<b>[WZ4061] Internship   Internship</b>	562 - 564
<b>[WI001122] Introduction to Business Law (MiM)   Introduction to Business Law (MiM) [BusLawMiM]</b>	205 - 206
<b>[CLA21005] Introduction to Diversity Management   Einführung in Diversity Management</b>	189 - 190

<b>[CLA21005] Introduction to Diversity Management</b>   Einführung in Diversity Management	270 - 271
<b>[WZ1822] Introduction to Economics and Business Ethics</b>   Introduction to Economics and Business Ethics	26 - 28
<b>[CLA21209] Introduction to Scientific Working</b>   Einführung in das wissenschaftliche Arbeiten	276 - 277
<b>[WZ2733] Introduction to Soil Science</b>   Introduction to Soil Science	345 - 346
<b>[WZ2733] Introduction to Soil Science</b>   Introduction to Soil Science	459 - 460
<b>[WZ1823] Inventory Methods, Statistics and GIS</b>   Inventory Methods, Statistics and GIS	14 - 16
<b>[SZ0602] Italian A1.1</b>   Italienisch A1.1	99 - 100
<b>[SZ0602] Italian A1.1</b>   Italienisch A1.1	101 - 102
<b>[SZ0601] Italian A1.1 + A1.2 - Intensive</b>   Italienisch A1.1 + A1.2 - Intensiv	97 - 98
<b>[SZ0605] Italian A1.2</b>   Italienisch A1.2	103 - 104
<b>[SZ0606] Italian A2.1</b>   Italienisch A2.1	132 - 133
<b>[SZ06091] Italian B1.2</b>   Italienisch B1.2	105 - 106
<b>[SZ0630] Italian B1/B2 Conversation</b>   Italienisch B1/B2 - Corso di conversazione	107 - 108

## J

---

<b>[SZ0705] Japanese A1.1</b>   Japanisch A1.1	113 - 114
<b>[SZ07052] Japanese A1.1 + A1.2</b>   Japanisch A1.1 + A1.2	115 - 116
<b>[SZ0709] Japanese A1.4</b>   Japanisch A1.4	117 - 118
<b>[CLA30258] Jazz Project</b>   Jazzprojekt	282 - 283

## K

---

<b>[SZ1808] Korean A1.1</b>   Koreanisch A1.1	119 - 120
---	-----------

## L

---

<b>Landscape Management</b>   Landscape Management	315
<b>[WZ4094] Landscape Management - Application Study</b>   Landscape Management - Application Study	322 - 323
<b>[WZ4094] Landscape Management - Application Study</b>   Landscape Management - Application Study	461 - 462
<b>[WZ2719] Landscape Planning</b>   Landscape Planning	317 - 318

<b>[WZ2719] Landscape Planning</b>   Landscape Planning	478 - 479
<b>Languages</b>   Sprachen	33
<b>[CLA31900] Lecture Series Environment - TUM</b>   Vortragsreihe Umwelt - TUM	286 - 287
<b>[WI001255] Lecture Series Renewable Energy Systems in the Global South</b>   Ringvorlesung Erneuerbare Energiesysteme im Globalen Süden	503 - 505

## M

---

<b>Management and Protection of Forest Ecosystems</b>   Management and Protection of Forest Ecosystems	295
<b>Management Aspects</b>   Management Aspects	24
<b>[POL70045] Master Seminar Business Ethics</b>   Masterseminar Wirtschaftsethik	207 - 209
<b>Master's Thesis</b>   Master's Thesis	565
<b>[WZ2754] Master's Thesis</b>   Master's Thesis	565 - 566
<b>Material and Waste Management</b>   Material and Waste Management	353
<b>[WZ4206] Material Flow Management and Applications</b>   Material Flow Management and Applications	355 - 356
<b>[WZ4206] Material Flow Management and Applications</b>   Material Flow Management and Applications	468 - 469
<b>[WZ1550] Mathematics for Economics</b>   Mathematics for Economics	210 - 211
<b>[WZ2713] Methods of Scientific Communication</b>   Methods of Scientific Communication	17 - 18
<b>[LS10013] Modelling and Statistical Analysis of Large Arrays</b>   Modelling and Statistical Analysis of Large Arrays [MASALA]	463 - 465
<b>[WZ2722] Mountain Catchments under Changing Climate</b>   Mountain Catchments under Changing Climate	339 - 340
<b>[WZ2722] Mountain Catchments under Changing Climate</b>   Mountain Catchments under Changing Climate	466 - 467

## N

---

<b>[WZ1821] Natural Resources - Traits, Management and Theory of Sustainability</b>   Natural Resources - Traits, Management and Theory of Sustainability	19 - 20
<b>[WI001215] Network and stakeholder analysis: Sustainable resource use and agri-food system</b>   Network and stakeholder analysis: Sustainable resource use and agri-food system	380 - 382

<b>[WI001215] Network and stakeholder analysis: Sustainable resource use and agri-food system</b>   Network and stakeholder analysis: Sustainable resource use and agri-food system	475 - 477
<b>[SZ1701] Norwegian A1</b>   Norwegisch A1	125 - 126
<b>[SZ1703] Norwegian B1</b>   Norwegisch B1	127 - 128

## P

---

<b>[CLA21023] Passing Exams in Relaxed Mode</b>   Entspannt Prüfungen bestehen	274 - 275
<b>[WI001205] People in Organizations: Managing Change and Sustainability in Agribusiness and the Food Industry</b>   People in Organizations: Managing Change and Sustainability in Agribusiness and the Food Industry	483 - 485
<b>[CLA21115] Philosophy of Human-Machine Interaction</b>   Philosophie der Mensch-Maschine-Beziehung	228 - 229
<b>[ED0151] Philosophy of Technology (Advanced Topics)</b>   Technikphilosophie (vertieft)	220 - 221
<b>[WZ4082] Plantation Forestry and Agroforestry</b>   Plantation Forestry and Agroforestry	303 - 305
<b>[WZ4082] Plantation Forestry and Agroforestry</b>   Plantation Forestry and Agroforestry	486 - 488
<b>[WZ4202] Political and Social Perspectives of Renewable Resources</b>   Political and Social Perspectives of Renewable Resources	333 - 334
<b>[WZ4202] Political and Social Perspectives of Renewable Resources</b>   Political and Social Perspectives of Renewable Resources	491 - 492
<b>[SZ0801] Portuguese A1</b>   Portugiesisch A1	134 - 136
<b>[SZ0806] Portuguese A2.1</b>   Portugiesisch A2.1	137 - 139
<b>[SZ0809] Portuguese B1.1</b>   Portugiesisch B1.1	143 - 145
<b>[SZ0808] Portuguese B1.2</b>   Portugiesisch B1.2	140 - 142
<b>[SZ0815] Portuguese - Portuguese for Spanish speakers A1 + A2</b>   Portugiesisch - Português para hispanofalantes A1 + A2	129 - 131
<b>[CLA10716] Positions of Modern Design</b>   Positionen des modernen Designs	240 - 241
<b>[CLA11301] Presentation Training with Video Feedback</b>   Präsentationstraining vor der Kamera	246 - 247
<b>[EI74831] Project Lab Renewable and Sustainable Energy Systems</b>   Project Lab Renewable and Sustainable Energy Systems [PropENS]	480 - 482
<b>[WZ2712] Project Management and Cross Cultural Communication</b>   Project Management and Cross Cultural Communication	29 - 30
<b>[WZ4197] Protected Areas Biodiversity and Management</b>   Protected Areas Biodiversity and Management	306 - 307

<b>[WZ4197] Protected Areas Biodiversity and Management</b>   Protected Areas Biodiversity and Management	489 - 490
---	-----------

## R

---

<b>[LS10007] Remediation of Contaminated Sites – Lecture and Seminar</b>   Remediation of Contaminated Sites – Lecture and Seminar	498 - 499
<b>[WZ2737] Remote Sensing and Image Processing</b>   Remote Sensing and Image Processing	319 - 321
<b>[WZ2737] Remote Sensing and Image Processing</b>   Remote Sensing and Image Processing	511 - 513
<b>[LS10003] Remote Sensing of Agriculture and Vegetation</b>   Remote Sensing of Agriculture and Vegetation	493 - 494
<b>[WZ2720] Renewable Energy Technologies</b>   Renewable Energy Technologies	327 - 328
<b>[WZ2720] Renewable Energy Technologies</b>   Renewable Energy Technologies	509 - 510
<b>Renewable Resources</b>   Renewable Resources	324
<b>Required Modules</b>   Pflichtmodule	14
<b>[WZ1674] Research Methods and Economic Research Project</b>   Research Methods and Economic Research Project	506 - 508
<b>[LS10004] Research Project ‘Smart Agriculture’</b>   Research Project ‘Smart Agriculture’	495 - 497
<b>[LS20016] Rhizosphere Research</b>   Rhizosphere Research	500 - 502

## S

---

<b>[CIT3640001] Sanitätsausbildung</b>   Sanitätsausbildung	212 - 213
<b>Science Topics</b>   Science Topics	295
<b>[CLA90142] Self-Competence - Intensive Course</b>   Selbstkompetenz - intensiv	288 - 290
<b>[CLA20552] Self-Written, Newly Read - A Literary Writers' Lab</b>   Selbst geschrieben, neu gelesen - Eine literarische Schreibwerkstatt	260 - 261
<b>[MCTS9001] Social Studies of Data Science &amp; Engineering</b>   Social Studies of Data Science & Engineering	214 - 216
<b>[LS20023] Soil and Plant Hydrology</b>   Soil and Plant Hydrology	514 - 515
<b>[WZ2734] Soil Protection</b>   Soil Protection	347 - 348
<b>[WZ2734] Soil Protection</b>   Soil Protection	525 - 526
<b>[SZ1201] Spanish A1</b>   Spanisch A1	152 - 153
<b>[SZ1207] Spanish A1 + A2.1</b>   Spanisch A1 + A2.1	162 - 164
<b>[SZ1202] Spanish A2.1</b>   Spanisch A2.1	154 - 156
<b>[SZ12031] Spanish A2.1 + A2.2</b>   Spanisch A2.1 + A2.2	160 - 161



<b>[SZ1203] Spanish A2.2</b>   Spanisch A2.2	157 - 159
<b>[SZ1218] Spanish B1.1</b>   Spanisch B1.1	175 - 176
<b>[SZ1225] Spanish B1.1 + B1.2</b>   Spanisch B1.1 + B1.2	179 - 180
<b>[SZ1216] Spanish B1.2</b>   Spanisch B1.2	170 - 171
<b>[SZ1219] Spanish B2.1</b>   Spanisch B2.1	177 - 178
<b>[SZ1217] Spanish B2.2</b>   Spanisch B2.2	172 - 174
<b>[SZ1209] Spanish C1 - current issues in Spain and Latin America</b>   Spanisch C1 - La actualidad en España y América Latina	165 - 167
<b>[SZ1212] Spanish C1 - Spain and Latin America - Yesterday and Today</b>   Spanisch C1 - España y América Latina ayer y hoy	168 - 169
<b>[SG8000160] Sponsorship-linked Marketing (Online-course)</b>   Sponsorship-linked Marketing (Online-Kurs)	217 - 219
<b>[WZ1921] Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry</b>   Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry	371 - 373
<b>[WZ1921] Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry</b>   Strategy, Supply Chain Management, and Sustainability in Agribusiness and the Food Industry	522 - 524
<b>[CLA21411] Stress Competence</b>   Stresskompetenz [EDS-M4]	278 - 279
<b>[SOT86611] Sustainability Politics and Policy</b>   Sustainability Politics and Policy	31 - 32
<b>[WZ1567] Sustainability: Paradigms, Indicators, and Measurement Systems</b>   Sustainability: Paradigms, Indicators, and Measurement Systems	374 - 376
<b>[WZ1567] Sustainability: Paradigms, Indicators, and Measurement Systems</b>   Sustainability: Paradigms, Indicators, and Measurement Systems	519 - 521
<b>Sustainable Agricultural Value Chains</b>   Sustainable Agricultural Value Chains	368
<b>[WZ2936] Sustainable and Environmental Regulations</b>   Sustainable and Environmental Regulations	529 - 531
<b>[WI001165] Sustainable Entrepreneurship - Getting Started</b>   Sustainable Entrepreneurship - Getting Started	516 - 518
<b>[ED160017] Sustainable Manufacturing</b>   Nachhaltige Produktion [SuM]	357 - 359
<b>[ED160017] Sustainable Manufacturing</b>   Nachhaltige Produktion [SuM]	472 - 474
<b>[SZ1001] Swedish A1</b>   Schwedisch A1	146 - 147
<b>[SZ1002] Swedish A2</b>   Schwedisch A2	148 - 149
<b>[SZ1003] Swedish B1</b>   Schwedisch B1	150 - 151
<b>[WZ1824] System Analysis and Introduction to Ecology</b>   System Analysis and Introduction to Ecology	21 - 23

## T

---

<b>[CLA10412] Technical Writing (Engineer Your Text!)   Technical Writing (Engineer Your Text!)</b>	234 - 235
<b>[CLA20121] The Sustainability Approach   Leitbild Nachhaltigkeit</b>	252 - 253
<b>[CLA20704] Thinking, Perceiving, and Knowing   Denken, Erkennen und Wissen</b>	262 - 263
<b>[CLA30704] Thinking, Perceiving, and Knowing   Denken, Erkennen und Wissen</b>	284 - 285
<b>[MW2245] Think. Make. Start.   Think. Make. Start. [TMS]</b>	222 - 225
<b>[BGU70005] Transportation Economics   Transportökonomie [Transportation Economics]</b>	527 - 528
<b>[SZ1404] Turkish A1.1   Türkisch A1.1</b>	181 - 182

## U

---

<b>[CLA11207] Understanding Art 1: Art Reception in front of Originals in Museums in Munich   Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen</b>	244 - 245
<b>[WZ1344] Urban Agriculture   Urban Agriculture</b>	537 - 539
<b>[WZ0528] Urban Forestry   Urban Forestry</b>	534 - 536
<b>[BGU38038] Urban Water-Energy-Food Nexus   Urban Water-Energy-Food Nexus [WEF Nexus]</b>	532 - 533
<b>[WZ2723] Utilization and Treatment of Special Materials and Waste   Utilization and Treatment of Special Materials and Waste</b>	360 - 361
<b>[WZ2723] Utilization and Treatment of Special Materials and Waste   Utilization and Treatment of Special Materials and Waste</b>	540 - 541

## V

---

<b>[WZ4201] Vegetation Ecology and Geographical Information Systems   Vegetation Ecology and Geographical Information Systems</b>	315 - 316
<b>[WZ4201] Vegetation Ecology and Geographical Information Systems   Vegetation Ecology and Geographical Information Systems</b>	544 - 545
<b>[LS10006] Vertical Farming (MSc.)   Vertical Farming (MSc.)</b>	542 - 543

## W

---

<b>[WZ4207] Waste and Waste Water Treatment</b>   Waste and Waste Water Treatment	365 - 367
<b>[WZ4207] Waste and Waste Water Treatment</b>   Waste and Waste Water Treatment	555 - 557
<b>[BGU38014] Water and Wastewater Treatment Engineering</b>   Wasserversorgung, Wasseraufbereitung und Abwasserbehandlung	362 - 364
<b>[WZ6432] Wildlife and Conservation Biology</b>   Wildlife and Conservation Biology	313 - 314
<b>[WZ6432] Wildlife and Conservation Biology</b>   Wildlife and Conservation Biology	558 - 559
<b>Wildlife and Protected Area Management</b>   Wildlife and Protected Area Management	306
<b>[WZ4198] Wildlife Management and Wildlife-Human Interactions</b>   Wildlife Management and Wildlife-Human Interactions	308 - 309
<b>[WZ4198] Wildlife Management and Wildlife-Human Interactions</b>   Wildlife Management and Wildlife-Human Interactions	553 - 554
<b>[WZ1413] Wildlife Monitoring in Ecology: Concepts, Methods and Application</b>   Wildlife Monitoring in Ecology: Concepts, Methods and Application	549 - 550
<b>[WZ2735] World Soil Resources</b>   World Soil Resources	349 - 350
<b>[WZ2735] World Soil Resources</b>   World Soil Resources	551 - 552
<b>[CLA10029] Writer's Lab</b>   Writer's Lab	232 - 233

## Y

---

<b>[LS50016] Yale Field Trip with Preparatory Seminar</b>   Yale Field Trip with Preparatory Seminar [Yale]	560 - 561
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