TUM School of Life Sciences
Technische Universität München

Module Catalog

M.Sc. Sustainable Resource Management

TUM School of Life Sciences

Technische Universität München

www.tum.de/
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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 570

[20151] Sustainable Resource Management | Masterstudium Sustainable Resource Management
Required Modules | Pflichtmodule 14
[WZ1821] Natural Resources - Traits, Management and Theory of Sustainability | Natural Resources - Traits, Management and Theory of Sustainability 14 - 15
[WZ1822] Introduction to Economics and Business Ethics | Introduction to Economics and Business Ethics 16 - 18
[WZ1823] Inventory Methods, Statistics and GIS | Inventory Methods, Statistics and GIS 19 - 21
[WZ1824] System Analysis and Introduction to Ecology | System Analysis and Introduction to Ecology 22 - 24
[WZ2713] Methods of Scientific Communication | Methods of Scientific Communication 25 - 26
General Education Subject | General Education Subject 27
[SG810003] Advanced Statistics | Advanced Statistics 27 - 28
[SZ0118] Arabic A1.1 | Arabisch A1.1 29 - 30
[WZ1647] Remediation of Contaminated Sites - Lecture and Exercises | Altlastensanierung - Vorlesung und Übungen 31 - 33
[SZ03031] Intensive Course German as a Foreign Language A2.1 | Blockkurs Deutsch als Fremdsprache A2.1 34 - 35
[SZ03041] Intensive Course German as a Foreign Language A2.2 | Blockkurs Deutsch als Fremdsprache A2.2 36 - 37
[SZ03061] Intensive Course German as a Foreign Language B1.2 | Blockkurs Deutsch als Fremdsprache B1.2 38 - 39
[SZ08011] Intensive Course Portuguese A1 | Blockkurs Portugiesisch A1 40
[SZ08061] Intensive Course Portuguese A2.1 | Blockkurs Portugiesisch A2.1 41
[POL40300] Computational Methods | Computational Methods 42 - 43
[SZ0209] Chinese A1.1 | Chinesisch A1.1 44 - 45
[SZ0211] Chinese A2.1 | Chinesisch A2.1 46 - 47
[SZ0303] German as a Foreign Language A2.1 | Deutsch als Fremdsprache A2.1 48 - 49
[SZ0304] German as a Foreign Language A2.2 | Deutsch als Fremdsprache A2.2 50 - 51
[SZ0321] German as a Foreign Language A1.1 plus A1.2 | Deutsch als Fremdsprache A1.1 plus A1.2 52 - 53
[SZ0322] German as a Foreign Language A2.1 plus A2.2 | Deutsch als Fremdsprache A2.1 plus A2.2 54 - 56
[SZ0323] German as a Foreign Language B1.1 plus B1.2 | Deutsch als Fremdsprache B1.1 plus B1.2 57 - 59

[SZ0350] German as a Foreign Language B1.1 | Deutsch als Fremdsprache B1.1 60 - 61
[SZ0351] German as a Foreign Language B1.2 | Deutsch als Fremdsprache B1.2 62 - 64
[CLA20230] Ethics and Responsibility | Ethik und Verantwortung 65 - 66
[CLA21005] Introduction to Diversity Management | Einführung in Diversity Management 67 - 68
[IN9017] Entrepreneurship | Existenzgründung 69 - 70
[SZ04043] English - English in action - What is Art? from B2 | Englisch - English in action - What is Art? ab B2 71 - 72
[SZ0406] English - Writing Academic Research Papers C2 | Englisch - Writing Academic Research Papers C2 73 - 74
[SZ0453] English - Scientific Presentation and Writing C2 | Englisch - Scientific Presentation and Writing C2 75 - 76
[SZ0454] English - Basic English for Scientific Purposes B2 | Englisch - Basic English for Scientific Purposes B2 77 - 78
[SZ0471] English - Intensive Thesis Writers' Workshop C2 | Englisch - Intensive Thesis Writers' Workshop C2 79 - 80
[WZ6326] Experimental Restoration Ecology | Experimentelle Renaturierungsökologie [ExpRes] 81 - 82
[SZ0501] French A1.1 | Französisch A1.1 83 - 84
[SZ0502] French A1.2 | Französisch A1.2 85 - 86
[SZ0503] French A2.1 | Französisch A2.1 87 - 89
[SZ0505] French B1.1 | Französisch B1.1 90 - 91
[SZ05061] French B1.2 | Französisch B1.2 92 - 93
[SZ0514] French B2 - Communication Course | Französisch B2 - Cours de conversation 94 - 96
[SZ0515] French C1 - Upper Conversation Course | Französisch C1 - Cours de conversation supérieure 97 - 99
[SZ0522] French A1.1 + A1.2 | Französisch A1.1 + A1.2 100 - 101
[POL65101] Global Health (MSc.) | Global Health (MSc.) 102 - 103
[SZ0607] Italian A2.1 + A2.2 - Intensive | Italienisch A2.1 + A2.2 - Intensiv 104 - 105
[SZ0601] Italian A1.1 + A1.2 - Intensive | Italienisch A1.1 + A1.2 - Intensiv 106 - 107
[SZ0602] Italian A1.1 | Italienisch A1.1 108 - 109
[SZ0602] Italian A1.1 | Italienisch A1.1 110 - 111
[SZ0605] Italian A1.2 | Italienisch A1.2 112 - 113
[SZ0630] Italian B1/B2 Conversation | Italienisch B1/B2 - Corso di conversazione 114 - 115
[SZ1304] Hebrew A1.1 | Hebräisch A1.1 116 - 117
[SZ1305] Hebrew A1.2 | Hebräisch A1.2 118 - 119
[WI001122] Introduction to Business Law (MiM) | Introduction to Business Law (MiM) [BusLawMiM] 120 - 121

[SZ0705] Japanese A1.1 | Japanisch A1.1 122 - 123
[SZ07052] Japanese A1.1 + A1.2 | Japanisch A1.1 + A1.2 124 - 125
[SZ1808] Korean A1.1 | Koreanisch A1.1 126 - 127
[SZ1809] Korean A1.2 | Koreanisch A1.2 128 - 129
[MCTS0036] Moderation (RESET) | Moderation (RESET) 130 - 131
[POL70045] Master Seminar Business Ethics | Masterseminar Wirtschaftsethik 132 - 134
[WZ1550] Mathematics for Economics | Mathematics for Economics 135 - 136
[SZ1601] Dutch A1 | Niederländisch A1 137 - 138
[SZ1602] Dutch A2 | Niederländisch A2 139 - 140
[SZ1701] Norwegian A1 | Norwegisch A1 141 - 142
[SZ1703] Norwegian B1 | Norwegisch B1 143 - 144
[WZ4009] Ecology of Mountain Forests | Ökologie des Gebirgswaldes 145 - 146
[SZ0801] Portuguese A1 | Portugiesisch A1 147 - 149
[SZ0808] Portuguese B1.2 | Portugiesisch B1.2 150 - 152
[SZ0809] Portuguese B1.1 | Portugiesisch B1.1 153 - 155
[WI000336] Policy of Landscape Development | Politik der Landschaftsentwicklung 156 - 157
[WZ2398] Practical Ecotoxicology | Praktische Ökotoxikologie 158 - 159
[WZ2405] Phylogeny and Zoology of Vertebrates | Phylogenie und Zoologie der Vertebraten 160 - 161
[BV210013] Urban und Regional Planning | Stadt- und Regionalplanung 162 - 164
[BV400016] Scientific Paper Writing | Selbständig wissenschaftlich Arbeiten 165 - 166
[CIT3640001] Sanitätsausbildung | Sanitätsausbildung 167 - 168
[MCTS9001] Social Studies of Data Science & Engineering | Social Studies of Data Science & Engineering 169 - 171
[SG8000160] Sponsorship-linked Marketing (Online-course) | Sponsorship-linked Marketing (Online-Kurs) 172 - 174
[SZ1001] Swedish A1 | Schwedisch A1 175 - 176
[SZ1002] Swedish A2 | Schwedisch A2 177 - 178
[SZ1201] Spanish A1 | Spanisch A1 179 - 180
[SZ1202] Spanish A2.1 | Spanisch A2.1 181 - 183
[SZ1203] Spanish A2.2 | Spanisch A2.2 184 - 186
[SZ12031] Spanish A2.1 + A2.2 | Spanisch A2.1 + A2.2 187 - 188
[SZ1212] Spanish C1 - Spain and Latin America - Yesterday and Today | Spanisch C1 - España y América Latina ayer y hoy 189 - 190
[SZ1216] Spanish B1.2 | Spanisch B1.2 191 - 192
[SZ1217] Spanish B2.2 | Spanisch B2.2 193 - 195
[SZ1218] Spanish B1.1 | Spanisch B1.1 196 - 197
[SZ1219] Spanish B2.1 | Spanisch B2.1 198 - 199
[SZ1225] Spanish B1.1 + B1.2 | Spanisch B1.1 + B1.2 200 - 201

[WZ1676] Sustainable Land Use and Nutrition | Sustainable Land Use and Nutrition 202 - 203
[CLA20210] Philosophy of Technology | Technikphilosophie 204 - 205
[ED0151] Philosophy of Technology (Advanced Topics) | Technikphilosophie (vertieft) 206 - 207
[MW2245] Think. Make. Start. | Think. Make. Start. [TMS] 208 - 211
[SZ1402] Turkish A2.1 | Türkisch A2.1 212 - 213
[SZ1404] Turkish A1.1 | Türkisch A1.1 214 - 215
[WZ2760] The Great Transformation - Approaches to and Examples of Transformational Change in Business & Society | The Great Transformation - Approaches to and Examples of Transformational Change in Business & Society 216 - 218
[WZ0528] Urban Forestry | Urban Forestry 219 - 221
[CLA11207] Understanding Art 1: Art Reception infront of Originals in Museums in Munich | Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen 222 - 223
[SZ0504] French A2.2 | Französisch A2.2 224 - 225
[SZ0806] Portuguese A2.1 | Portugiesisch A2.1 226 - 228
[SZ1207] Spanish A1 + A2.1 | Spanisch A1 + A2.1 229 - 231
[SZ1209] Spanish C1 - current issues in Spain and Latin America | Spanisch C1 - La actualidad en España y América Latina 232 - 234
[WI001208] Introduction to Value Chain Economics | Introduction to Value Chain Economics 235 - 236
Carl von Linde-Akademie | Carl von Linde-Akademie 237
- **[CLA30267] Communication and Presentation** | Kommunikation und Präsentation 237 - 238
- **[CLA21115] Philosophy of Human-Machine Interaction** | Philosophie der Mensch-Maschine-Beziehung 239 - 240
- **[CLA11123] How to Produce Your Own Videos** | Videos selber machen 241 - 242
- **[MCTS0036] Moderation (RESET)** | Moderation (RESET) 243 - 244
- **[CLA10029] Writer's Lab** | Writer's Lab 245 - 246
- **[CLA10412] Technical Writing (Engineer Your Text!)** | Technical Writing (Engineer Your Text!) 247 - 248
- **[CLA10512] Getting More Effective - on My Own and in a Team** | Effektiver werden - allein und im Team 249 - 250
- **[CLA10555] Communication and Facilitation in Project Teams** | Communication and Facilitation in Project Teams 251 - 252
- **[CLA10714] Human Resources Development** | Personalentwicklung 253 - 254
- **[CLA10716] Positions of Modern Design** | Positionen des modernen Designs 255 - 256
- **[CLA10813] Economic Thinking: Economics** | Volkswirtschaftlich Denken 257 - 258

[CLA11207] Understanding Art 1: Art Reception infront of Originals in Museums in Munich | Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen 259 - 260
[CLA11301] Presentation Training with Video Feedback | Präsentationstraining vor der Kamera 261 - 262
[CLA11313] Conflict Management and Conducting Discussions | Konfliktmanagement und Gesprächsführung 263 - 264
[CLA11317] Interdisciplinary Lecture Series Environment: Politics and Society | Ringvorlesung Umwelt: Politik und Gesellschaft 265 - 266
[CLA20121] The Sustainability Approach | Leitbild Nachhaltigkeit 267 - 268
[CLA20231] Concepts of Human Being | Mensch und Menschenbilder 269 - 270
[CLA20267] Communication and Presentation | Kommunikation und Präsentation 271 - 272
[CLA20424] Intercultural Encounters | Interkulturelle Begegnungen 273 - 274
[CLA20552] Self-Written, Newly Read - A Literary Writers' Lab | Selbst geschrieben, neu gelesen - Eine literarische Schreibwerkstatt 275 - 276
[CLA20704] Thinking, Perceiving, and Knowing | Denken, Erkennen und Wissen 277 - 278
[CLA20705] Diversity and Conflict Management | Diversität und Konfliktmanagement 279 - 280
[CLA20710] Global Diversity Training | Global Diversity Training 281 - 282
[CLA20910] Gender Competence as Core Qualification | Genderkompetenz als Schlüsselqualifikation 283 - 284
[CLA21005] Introduction to Diversity Management | Einführung in Diversity Management 285 - 286
[CLA21008] Fundamental Principles of Globalisation | Grundlagen der Globalisierungsforschung 287 - 288
[CLA21023] Passing Exams in Relaxed Mode | Entspannt Prüfungen bestehen 289 - 290
[CLA21209] Introduction to Scientific Working | Einführung in das wissenschaftliche Arbeiten 291 - 292
[CLA21411] Stress Competence | Stresskompetenz [EDS-M4] 293 - 294
[CLA30257] Big Band | Big Band 295 - 296
[CLA30258] Jazz Project | Jazzprojekt 297 - 298
[CLA30704] Thinking, Perceiving, and Knowing | Denken, Erkennen und Wissen 299 - 300
[CLA31900] Lecture Series Environment - TUM | Vortragsreihe Umwelt - TUM 301 - 302
[CLA90142] Self-Competence - Intensive Course | Selbstkompetenz - intensiv 303 - 305
[CLA90211] Art and Politics | Kunst und Politik 306 - 307

[WZ0812] Cultural Competence: Choir and Orchestra | Kulturelle Kompetenz: Chor- und Orchester 308 - 309
Elective Courses | Wahlmodule 310
Fields of Specialization | Vertiefungsbereiche 310
Environmental Economics and Policy | Environmental Economics and Policy 310
[WI000286] Environmental and Natural Resource Economics | Environmental and Natural Resource Economics 310 - 312
[WZ1590] Climate Change Economics | Climate Change Economics 313 - 315
[WZ2936] Sustainable and Environmental Regulations | Sustainable and Environmental Regulations 316 - 318
Management and Protection of Forest Ecosystems | Management and Protection of Forest Ecosystems 319
[WZ4161] Forest Management | Forest Management 319 - 320
[WZ2716] Forest Growth and Forest Operations | Forest Growth and Forest Operations 321 - 323
[WZ2717] Genetic Resources Management and Forest Protection | Genetic Resources Management and Forest Protection 324 - 326
[WZ4082] Plantation Forestry and Agroforestry | Plantation Forestry and Agroforestry 327 - 329
Wildlife and Protected Area Management | Wildlife and Protected Area Management 330
[WZ4197] Protected Areas Biodiversity and Management | Protected Areas Biodiversity and Management 330 - 331
[WZ4198] Wildlife Management and Wildlife-Human Interactions | Wildlife Management and Wildlife-Human Interactions 332 - 333
[WZ6432] Wildlife and Conservation Biology | Wildlife and Conservation Biology 334 - 335
[WZ4189] Fisheries and Aquatic Conservation | Fisheries and Aquatic Conservation 336 - 338
Landscape Management | Landscape Management 339
[WZ2719] Landscape Planning | Landscape Planning 339 - 340
[WZ4094] Landscape Management - Application Study | Landscape Management - Application Study 341 - 342
[WZ2737] Remote Sensing and Image Processing | Remote Sensing and Image Processing 343 - 345
Renewable Resources | Renewable Resources 346
[WZ2720] Renewable Energy Technologies | Renewable Energy Technologies 346 - 347
[WZ2721] Agriculture Raw Materials and their Utilization | Agriculture Raw Materials and their Utilization [ARM&U] 348 - 349

[WZ4098] Forestry Raw Materials and their Utilization | Forestry Raw Materials and their Utilization 350 - 352
[WZ4202] Political and Social Perspectives of Renewable Resources | Political and Social Perspectives of Renewable Resources 353 - 354
Material and Waste Management | Material and Waste Management 355
[WZ4206] Material Flow Management and Applications | Material Flow Management and Applications 355 - 356
[ED160017] Sustainable Manufacturing | Nachhaltige Produktion [SuM] 357 - 359
[WZ2723] Utilization and Treatment of Special Materials and Waste | Utilization and Treatment of Special Materials and Waste 360 - 361
[WZ2724] Emission Control in Land-Use and Animal Husbandry | Emission Control in Land-Use and Animal Husbandry 362 - 363
Agricultural Land-Use Systems | Agricultural Land-Use Systems 364
[WZ2725] Land-Use Systems from Local and Global Perspectives | Land-Use Systems from Local and Global Perspectives 364 - 365
[WZ2726] Assessment of Sustainability in Agriculture - Theory and Case Studies | Assessment of Sustainability in Agriculture - Theory and Case Studies 366 - 367
[WZ2727] Sustainability of Food Chains | Sustainability of Food Chains 368 - 369
[WZ2728] Sustainable Land-Use Management | Sustainable Land-Use Management 370 - 371
Climate, Air and Water | Climate, Air and Water 372
[WZ2731] Hydrometeorology and Management of Water Resources | Hydrometeorology and Management of Water Resources 372 - 373
[WZ2722] Mountain Catchments under Changing Climate | Mountain Catchments under Changing Climate 374 - 375
[WZ2732] Environmental Monitoring and Data Analysis | Environmental Monitoring and Data Analysis 376 - 377
[WZ2730] Climate Change - Science, Impacts and Adaptation, Mitigation | Climate Change - Science, Impacts and Adaptation, Mitigation 378 - 379
| Soils and Soil Management 380
[WZ2733] Introduction to Soil Science | Introduction to Soil Science 380 - 381
[WZ2734] Soil Protection | Soil Protection 382 - 383
[WZ2735] World Soil Resources | World Soil Resources 384 - 385
[WZ2736] Analytical Characterization of Soil Resources | Analytical Characterization of Soil Resources 386 - 387
Elective Modules | Elective Modules 388
[BGU38019] Anaerobic Processes and Energy Recovery | Anaerobtechnik und Energierückgewinnung 388 - 389

[CS0126] Advanced Seminar in Circular Economy and Sustainability Management | Advanced Seminar in Circular Economy and Sustainability Management [ASCESM] 390 - 391
[WZ0246] Advanced Concepts and Methods in Urban Ecosystems | Advanced Concepts and Methods in Urban Ecosystems 392 - 395
[WZ2721] Agriculture Raw Materials and their Utilization | Agriculture Raw Materials and their Utilization [ARM&U] 396 - 397
[WZ2726] Assessment of Sustainability in Agriculture - Theory and Case Studies | Assessment of Sustainability in Agriculture - Theory and Case Studies 398 - 399
[WZ2736] Analytical Characterization of Soil Resources | Analytical Characterization of Soil Resources 400 - 401
[WZ2757] Advanced Environmental and Natural Resource Economics | Advanced Environmental and Natural Resource Economics 402 - 404
[WZ1590] Climate Change Economics | Climate Change Economics 405 - 407
[WZ2730] Climate Change - Science, Impacts and Adaptation, Mitigation | Climate Change - Science, Impacts and Adaptation, Mitigation 408 - 409
[LS20022] Experimental Methods in Soil and Plant Hydrology | Experimental Methods in Soil and Plant Hydrology 410 - 411
[POL62200] Energy Transformation | Energy Transformation 412 - 414
[WI000286] Environmental and Natural Resource Economics | Environmental and Natural Resource Economics 415 - 416
[WI001204] Economics of Water Use, Regulation and Markets | Economics of Water Use, Regulation and Markets 417 - 419
[WZ0228] Exercises in Precision Agriculture and Plant Phenotyping | Exercises in Precision Agriculture and Plant Phenotyping 420 - 422
[WZ1876] Entrepreneurship in the Agricultural and Horticultural Industry | Entrepreneurship in der Agrar- und Gartenbauwirtschaft 423 - 425
[WZ2724] Emission Control in Land-Use and Animal Husbandry | Emission Control in Land-Use and Animal Husbandry 426 - 427
[WZ2732] Environmental Monitoring and Data Analysis | Environmental Monitoring and Data Analysis 428 - 429
[BGU62039] Case Studies of Sustainable Urban Developments and Infrastructure | Fallstudien nachhaltiger Quartiers-, Stadt- und Infrastrukturentwicklungen [FNQSI] 430 - 432
[WZ2716] Forest Growth and Forest Operations | Forest Growth and Forest Operations 433 - 435
[WZ4098] Forestry Raw Materials and their Utilization | Forestry Raw Materials and their Utilization 436 - 438
[WZ4161] Forest Management | Forest Management 439 - 440
[WZ4189] Fisheries and Aquatic Conservation | Fisheries and Aquatic Conservation 441 - 443

[IN2124] Basic Mathematical Methods for Imaging and Visualization | Basic Mathematical Methods for Imaging and Visualization 444 - 446
[WZ2717] Genetic Resources Management and Forest Protection | Genetic Resources Management and Forest Protection 447 - 449
[WZ1545] Human Resource Management in Agriculture and Related Industries | Human Resource Management in Agriculture and Related Industries 450 - 451
[WZ2731] Hydrometeorology and Management of Water Resources | Hydrometeorology and Management of Water Resources 452 - 453
[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] 454 - 456
[LS50000] International Climate Strategies / UNFCCC | International Climate Strategies / UNFCCC 457 - 459
[WZ2733] Introduction to Soil Science | Introduction to Soil Science 460 - 461
[WZ2725] Land-Use Systems from Local and Global Perspectives | Land-Use Systems from Local and Global Perspectives 462 - 463
[WZ4094] Landscape Management - Application Study | Landscape Management - Application Study 464 - 465
[WI001164] Modeling and Optimization in Energy Markets | Modeling and Optimization in Energy Markets 466 - 468
[WZ2722] Mountain Catchments under Changing Climate | Mountain Catchments under Changing Climate 469 - 470
[WZ4206] Material Flow Management and Applications | Material Flow Management and Applications 471 - 472
[BGU38023] Engineered Natural Treatment Systems | Natürliche Aufbereitungsverfahren 473 - 474
[ED160017] Sustainable Manufacturing | Nachhaltige Produktion [SuM] 475 - 477
[WI001215] Network and stakeholder analysis: Sustainable resource use and agri-food system | Network and stakeholder analysis: Sustainable resource use and agri-food system 478 - 480
[WZ2719] Landscape Planning | Landscape Planning 481 - 482
[EI74831] Project Lab Renewable and Sustainable Energy Systems | Project Lab Renewable and Sustainable Energy Systems [PropENS] 483 - 485
[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 486 - 488
[WZ4082] Plantation Forestry and Agroforestry | Plantation Forestry and Agroforestry 489 - 491

[WZ4197] Protected Areas Biodiversity and Management | Protected Areas Biodiversity and Management 492 - 493
[WZ4202] Political and Social Perspectives of Renewable Resources | Political and Social Perspectives of Renewable Resources 494 - 495
[LS10003] Remote Sensing of Agriculture and Vegetation | Remote Sensing of Agriculture and Vegetation 496 - 497
[LS10004] Research Project 'Smart Agriculture' | Research Project 'Smart Agriculture' 498 - 500
[LS10007] Remediation of Contaminated Sites – Lecture and Seminar | Remediation of Contaminated Sites – Lecture and Seminar 501 - 502
[LS20016] Rhizosphere Research | Rhizosphere Research 503 - 505
[WZ1674] Research Methods and Economic Research Project | Research Methods and Economic Research Project 506 - 508
[WZ2720] Renewable Energy Technologies | Renewable Energy Technologies 509 - 510
[WZ2737] Remote Sensing and Image Processing | Remote Sensing and Image Processing 511 - 513
[LS20023] Soil and Plant Hydrology | Soil and Plant Hydrology 514 - 515
[WI001165] Sustainable Entrepreneurship - Getting Started | Sustainable Entrepreneurship - Getting Started 516 - 518
[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 519 - 521
[WZ2727] Sustainability of Food Chains | Sustainability of Food Chains 522 - 523
[WZ2728] Sustainable Land-Use Management | Sustainable Land-Use Management 524 - 525
[WZ2734] Soil Protection | Soil Protection 526 - 527
[WZ2936] Sustainable and Environmental Regulations | Sustainable and Environmental Regulations 528 - 530
[BGU70005] Transportation Economics | Transportökonomie [Transportation Economics] 531 - 532
[BGU38033] Planning the Urban Water-Energy-Food Nexus | Urban Water-Energy-Food Nexus Planung 533 - 534
[WZ0528] Urban Forestry | Urban Forestry 535 - 537
[WZ1344] Urban Agriculture | Urban Agriculture 538 - 540
[WZ2723] Utilization and Treatment of Special Materials and Waste | Utilization and Treatment of Special Materials and Waste 541 - 542
[LS10006] Vertical Farming (MSc.) | Vertical Farming (MSc.) 543 - 544
[WZ0322] Ecological Colloquium: Scientific Foundations and Applications in Practice | Ökologisches Kolloquium: Wissenschaftliche Grundlagen und Anwendungen in der Praxis [SciTravels] 545 - 547
[WZ2735] World Soil Resources | World Soil Resources 548 - 549

[WZ4198] Wildlife Management and Wildlife-Human Interactions | Wildlife Management and Wildlife-Human Interactions 550 - 551
[WZ6432] Wildlife and Conservation Biology | Wildlife and Conservation Biology 552 - 553
Course Achievement | Studienleistungen 554
[WZ4061] Internship | Internship 554 - 555
Master's Thesis | Master's Thesis 556
[WZ2754] Master's Thesis | Master's Thesis 556 - 558
Requirement Proof of Proficiency in German | Nachweis Deutschkenntnisse 559
[WZ8000] Accredited Requirement Proof of Proficiency in German | Anerkennung Nachweis Deutschkenntnisse 559 - 560
[SZ03031] Intensive Course German as a Foreign Language A2.1 | Blockkurs Deutsch als Fremdsprache A2.1 561 - 562
[SZ0303] German as a Foreign Language A2.1 | Deutsch als Fremdsprache A2.1 563 - 564
[SZ0304] German as a Foreign Language A2.2 | Deutsch als Fremdsprache A2.2 565 - 566
[SZ0322] German as a Foreign Language A2.1 plus A2.2 | Deutsch als Fremdsprache A2.1 plus A2.2 567 - 569

Required Modules | Pflichtmodule

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 summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 80	**Contact Hours:** 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. Moreover, in the exam, they have to be able to apply the acquired knowledge for assessing real-world problems (as presented in the form of case studies) and to suggest and substantiate constructive solutions.

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:
After successful completion of the module 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, Mikula P, Parreno M, Savage C, Schad P
For further information in this module, please click 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

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

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 parallely 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

Courses (Type of course, Weekly hours per semester), Instructor:
Introduction to Economics (WZ1822, englisch) (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 or here.

Module Description

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

Version of module description: Gültig ab winterterm 2021/22

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 110	**Contact Hours:** 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; 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

Inventory Methods (Vorlesung, 2 SWS)
Knoke T, Mengesha M

Statistics (Vorlesung, 1 SWS)

Knoke T, Pintado K
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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, unitarity, 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 nth 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:
Systems Analysis (Vorlesung, 2 SWS)
Biber P

Introduction into Ecology (Vorlesung, 2 SWS)
Meyer S [L], Meyer S, Heinen R, Achury Morales R
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 4	**Total Hours:** 120	**Self-study Hours:** 90	**Contact Hours:** 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 or here.

General Education Subject | General Education Subject

Module Description

SG810003: Advanced Statistics | Advanced Statistics

Version of module description: Gültig ab summerterm 2017

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 tutorium. 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 tutorium 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)
Batta M, Hansmann K

Advanced Statistics (Vorlesung, 2 SWS)
Schauberger G
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0118: Arabic A1.1 | Arabisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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
For further information in this module, please click campus.tum.de or here.

Module Description

WZ1647: Remediation of Contaminated Sites - Lecture and Exercises | Altlastensanierung - Vorlesung und Übungen

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** German	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 exam (120 min). On the basis of the written examination, students demonstrate that they understand legal regulations dealing with contaminated sites, can evaluate the hazard potential of a contaminated site with regard to the type of pollutants and the emission pathway, understand the various investigation methods and can evaluate a suitable sampling strategy and analytical investigation program.

The module "Remediation of contaminated sites - Lecture and exercises" is an alternative module to "Remediation of contaminated sites - Lecture and seminar" (LS10007). Only one of the two modules can be completed.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Basics of soil science

Content:
Lecture: Federal Soil Protection Act, procedure for the investigation of contaminated sites; contamination typical of the industry (old deposits - old sites, old armaments and military sites); assessment of contaminants (primary contaminants - priority contaminants, material transport, exposure); Hazard potential, ecotoxicological tests; investigation of contaminated sites (investigation methods, sampling strategy, analytical investigation program); remediation objectives; safety measures; decontamination procedures; recultivation and renaturation (soils on contaminated sites, post-mining landscapes).

Exercises: Visit to contaminated sites in the Munich area: Biological ex-situ remediation of organically contaminated soils; sampling of contaminated soil material in piles; immission control requirements for companies working on contaminated sites; sorting and (interim) storage of contaminated soils prior to disposal in suitable landfills; LAGA landfill classes for the classification of contaminated soils; recycling options for contaminated material; innovative in-situ remediation and securing measures; relationship between investment and operating costs for long-term remediation measures; securing measures in post-mining landscapes; specific problems in lignite mining landscapes; evaluation of recultivation and renaturation measures; legal background: Federal soil protection, recycling management and water protection law.

Intended Learning Outcomes:
After successfully completing the module courses, students will be able to understand legal regulations dealing with contaminated sites, apply the correct procedure for the investigation of contaminated sites and suspected contaminated sites as well as for the remediation of contaminated sites, evaluate the hazard potential of a contaminated site with regard to the type of pollutants and the emission pathway, understand the various investigation methods and evaluate a suitable sampling strategy and analytical investigation program, evaluate different remediation techniques and recultivation measures and apply the appropriate one depending on the respective contaminated site. In addition, students will be able to evaluate various contaminated sites and operations and critically analyze the remediation methods used with regard to remediation success and environmental impact.

Teaching and Learning Methods:
The module consists of a lecture and an exercise. In the lecture, students are taught the legal regulations dealing with contaminated sites, the correct procedure for the investigation of contaminated sites and suspected contaminated sites and for the remediation of contaminated sites, the hazard potential of a contaminated site with regard to the type of pollutants and the emission pathway, the various investigation methods and a suitable sampling strategy and analytical investigation program, different remediation techniques and recultivation measures.

In the exercises, students will visit selected contaminated sites and remediation facilities, evaluate various contaminated sites and remediation companies, and critically analyze the remediation methods used with regard to remediation success and environmental impact.

Media:
Präsentationen

Reading List:
Presentations; in-depth book list on request

Responsible for Module:
Kögel-Knabner, Ingrid; Prof. Dr. rer. nat. Dr. rer. nat. habil.

Courses (Type of course, Weekly hours per semester), Instructor:
Altlastensanierung - Kontaminierte und rekultivierte Böden (Übung, 2,1 SWS)
Höschen C, Heister K

Remediation of Contaminated Sites - Regeneration of contaminated soils (Vorlesung, 2 SWS)
Zare M
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 4	**Total Hours:** 120	**Self-study Hours:** 60	**Contact Hours:** 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)
Hanke C, Hoff L
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 4	**Total Hours:** 120	**Self-study Hours:** 60	**Contact Hours:** 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)
Steidten R
For further information in this module, please click 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

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

POL40300: Computational Methods | Computational Methods

Version of module description: Gültig ab summerterm 2022

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

For further information in this module, please click campus.tum.de or here.

Module Description

SZ0209: Chinese A1.1 | Chinesisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 Satzelemente 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)
Fu Y, Kralle J, Lee M, Zhou H
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0211: Chinese A2.1 | Chinesisch A2.1

Version of module description: Gültig ab summerterm 2022

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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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, Comparato G, Dechant S, Detcheva-Knippelmeyer I, Körner C, Kostial M, Kummer-Rock A, Lebling-Gemaljevic J, Meuschel G, Mielert A, Schmidt-Bender S

Deutsch als Fremdsprache A2.1 - EuroTeQ (Seminar, 4 SWS)
Kostial M
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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, Comparato G, Dechant S, Feistle C, Grigorieva A, Hagner V, Körner C, Kovacs O, Kummer-Rock A, Steidten R, Thiessen E
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 8	**Total Hours:** 270	**Self-study Hours:** 180	**Contact Hours:** 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, Schlüter J
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 8	**Total Hours:** 270	**Self-study Hours:** 180	**Contact Hours:** 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)
Hanke C, Reulein C, Zerfass A

For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 8	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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)
Hartkopf D, Karsten-Ott M, Kraut-Schindlbeck S, Stoephasius J
For further information in this module, please click 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

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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 4	**Total Hours:** 135	**Self-study Hours:** 90	**Contact Hours:** 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:
Blockkurs Deutsch als Fremdsprache B1.2 (Seminar, 3 SWS)
Aristakesyan V, Schimmack B
For further information in this module, please click campus.tum.de or here.

Module Description

CLA20230: Ethics and Responsibility | Ethik und Verantwortung

Version of module description: Gültig ab summerterm 2014

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 30	**Contact Hours:** 30

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

Description of Examination Method:
In einem Referat (1500-2000 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 Technology (Vorlesung, 2 SWS)
Campos Sasdelli D

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 or here.

Module Description

CLA21005: Introduction to Diversity Management | Einführung in Diversity Management

Version of module description: Gültig ab winterterm 2013/14

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 45	**Contact Hours:** 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 (Ein interaktives Lernprojekt) (Workshop, 1 SWS)
Fänderl W, Quindeau A
For further information in this module, please click campus.tum.de or here.

Module Description

IN9017: Entrepreneurship | Existenzgründung

Version of module description: Gültig ab winterterm 2011/12

Module Level: Bachelor	**Language:** German	**Duration:** one semester	**Frequency:** summer semester
Credits:* 4	**Total Hours:** 120	**Self-study Hours:** 90	**Contact Hours:** 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 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

Module Level: Bachelor/Master	**Language:** English	**Duration:** one semester	**Frequency:** irregularly
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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. (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, 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 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

Module Level: Bachelor/Master	**Language:**	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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. (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)
Davies A, Hughes K
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:**	**Self-study Hours:**	**Contact Hours:**

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 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

Module Level: Bachelor/Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, the will impove 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
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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. 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:
Englisch - Intensive Thesis Writers' Workshop C2 (Workshop, 2 SWS)
Jacobs R, Wellershausen N

Blockkurs Englisch - Intensive Thesis Writers' Workshop C2 (Seminar, 2 SWS)
Wellershausen N
For further information in this module, please click campus.tum.de or here.

Module Description

WZ6326: Experimental Restoration Ecology | Experimentelle Renaturierungsökologie [ExpRes]

Version of module description: Gültig ab winterterm 2022/23

Module Level: Master	**Language:** German/English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 60

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

Description of Examination Method:
Die Note des Moduls ergibt sich aus einer mündlichen Prüfung (20 min). Anhand der Prüfung zeigen die Studierenden, dass sie die theoretischen Grundlagen und die Auswertung ökologischer Versuche verstehen und eigene Renaturierungsexperimente planen, durchführen, auswerten, darstellen und diskutieren können.
Darüber hinaus besteht die Möglichkeit, eine freiwillige Studienleistung als Mid-Term-Leistung gemäß APSO §6 Abs. 5 zu erbringen. Hierfür werden die Planung, die Durchführung und die Ergebnisse des Versuchs in einem Bericht (ca. 20-30 Seiten) dargelegt und in einer kurzen Präsentation (15 min) präsentiert. Durch das Bestehen der Studienleistung kann die Modulnote um 0,3 verbessert werden, wenn die Abweichung auf das Bestehen der Prüfung keinen Einfluss hat. Für die Mid-Term-Leistung wird kein Wiederholungstermin angeboten. Im Falle einer Wiederholung der Modulprüfung wird eine bereits erbrachte Mid-Term-Leistung berücksichtigt.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Grundkenntnisse der Renaturierungsökologie, mitteleuropäischer Pflanzenarten und ökologischer Prozesse, Literatursuche und Statistik.

Content:
Das Modul beinhaltet:
- theoretische Grundlagen ökologischer Experimente (inkl. Entwicklung wissenschaftlicher Fragestellungen, experimentellem Design, Methodenkenntnis und kritischer Bewertung der Versuchsergebnisse)

- aktuelle Themen der Renaturierungsökologie (z.B. Wiederansiedelung seltener Arten, Invasionsresistenz neuartiger Pflanzengemeinschaften, regionale Anpassung von Pflanzen der Renaturierung)
- Methoden der Renaturierungsökologie (z.B. Konkurrenzversuche, Samenbankuntersuchungen, Bestäubungsexperimente)

Intended Learning Outcomes:
Die Studierenden verstehen die theoretischen Grundlagen und die Auswertung ökologischer Versuche. Nach der Teilnahme an den Modulveranstaltungen sind die Studierenden in der Lage, eigene Renaturierungsexperimente im Labor und im Freiland zu planen, durchzuführen, auszuwerten und schriftlich darzustellen und zu diskutieren. Sie sind zudem in der Lage, ihre Versuchsergebnisse in wissenschaftlichen Vorträgen zu präsentieren und zu verteidigen.

Teaching and Learning Methods:
Die Vorlesung wird durch die Dozenten vorgetragen und durch Diskussion mit den Studierenden vertieft. In einer separaten Übung werden die Studierenden zur Planung, Durchführung und Auswertung eigener Experimente

angeleitet. Die Experimente werden gegen Ende des Semesters unter Anleitung der Dozenten ausgewertet, als Kurzberichte zusammengefasst und mündlich vorgetragen. Die Methodik dieser Veranstaltung entspricht daher einer Anleitung zum selbstständigen wissenschaftlichen Arbeiten.

Media:
PPT-Präsentationen, Lehrbuch, Wissenschaftliche Artikel, Messmethoden und Instrumente

Reading List:
Gibson, D.J. (2015): Methods in Comparative Plant Population Ecology. – Oxford University Press, Oxford.
Van Andel, J. & Aronson, J. (eds.) (2012): Restoration Ecology: The New Frontier. – Blackwell Publishing, Malden. Zerbe, S. & Wiegleb, G. (Hrsg.) (2001): Renaturierung von Ökosystemen in Mitteleuropa. – Spektrum Akademischer Verlag, Heidelberg.

Responsible for Module:
Kollmann, Johannes; Prof. Dr. rer. nat.

Courses (Type of course, Weekly hours per semester), Instructor:
Experimentelle Renaturierungsökologie (UE) (Übung, 3 SWS)
Kollmann J [L], Bauer M, Häberle K, Kollmann J, Rojas Botero S, Wagner T

Experimentelle Renaturierungsökologie (VO) (Vorlesung, 1 SWS)
Kollmann J [L], Kollmann J, Häberle K, Rojas Botero S, Wagner T
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0501: French A1.1 | Französisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, Cuneo M, Delavigne C, Gommeringer-Depraetere S, Kirchhoff A, Neumaier-Giacinti E, Paul E

Blockkurs Französisch A1.1 (Seminar, 2 SWS)
Cuneo M, Kirchhoff A
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0502: French A1.2 | Französisch A1.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, Bruel J, Neumaier-Giacinti E, Suek C

Blockkurs Französisch A1.2 (Seminar, 2 SWS)
Suek C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0503: French A2.1 | Französisch A2.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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:
Blockkurs Französisch A2.1 (Seminar, 2 SWS)
Bruel J, Suek C

Französisch A2.1 (Seminar, 2 SWS)
Comte-Maillard C, Kirchhoff A, Paul E, Suek C

For further information in this module, please click campus.tum.de or here.

Module Description

SZ0505: French B1.1 | Französisch B1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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:
Blockkurs Französisch B1.1 (Seminar, 2 SWS)
Bartanus J

Französisch B1.1 (Seminar, 2 SWS)
Bartanus J, Cuneo M
For further information in this module, please click campus.tum.de or here.

Module Description

SZ05061: French B1.2 | Französisch B1.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 or here.

Module Description

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

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** irregularly
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 90	**Contact Hours:** 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 or here.

Module Description

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

Version of module description: Gültig ab summerterm 2022

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

For further information in this module, please click campus.tum.de or here.

Module Description

SZ0522: French A1.1 + A1.2 | Französisch A1.1 + A1.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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 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.
Der/Die Studierende lernt z.B., einfache Fragen zu Person und Familie zu stellen und zu beantworten sowie über Themen wie Studium, Beruf, Freizeit, in einfachen Sätzen im Präsenz und Perfekt zu berichten. Es werden u.a. folgende grammatische Themen behandelt: Präsenz, Passé Composé, Futur proche, Artikel, Possessivbegleiter, direkte und indirekte Objektpronomen, Präpositionen, Fragesätze. 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 erlangt nach der Teilnahme an der Modulveranstaltung Grundkenntnisse in der Fremdsprache Französisch mit allgemeiner Orientierung unter Berücksichtigung interkultureller und landeskundlicher Aspekte. Er/sie ist 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 + A1.2 intensiv (Seminar, 4 SWS)
Bartanus J, Delavigne C
For further information in this module, please click 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 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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 lense. 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 welll as related empirical studies, differences between matrilineal and patrilineal societies, fertility and reporoductive 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 diseases 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 to assess the impact of various health interventions and health promotion 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 or here.

Module Description

SZ0607: Italian A2.1 + A2.2 - Intensive | Italienisch A2.1 + A2.2 - Intensiv

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** irregularly
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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:
Gesicherte Kenntnisse des Moduls A1.2 (bestandene Klausur) oder Einstufungstest mit Ergebnis A2.1.

Content:
Abschlussmodul des A-Niveaus des Gemeinsamen Europäischen Referenzrahmens für Sprachen (Grundstufe)
In diesem Modul werden Grundkenntnisse in der Fremdsprache Italienisch aufgebaut, die es den Studierenden – trotz noch geringer Sprachkenntnisse - ermöglichen, sich in Alltagssituationen wie z.B. beim Einkaufen oder bei der Wohnungssuche zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt.
Der/die Studierende lernt u.a. von Geschehnissen, Situationen und Gewohnheiten in der Vergangenheitsform zu erzählen; Personen physisch und charakterlich zu beschreiben; über die Familie zu sprechen; eine höfliche Aufforderung, einen Wunsch, eine Vermutung auszudrücken; Ratschläge bzw. Anweisungen zu geben; eine Entscheidung zu begründen und die eigene Meinung zu äußern.

Grammatische Themen wie z.B. Passato prossimo, Imperfetto, Adverbien, Imperativ, Konditional Präsens, Relativpronomen, Adverbien werden behandelt. Grundlegendes Wortschatz zu vertruaten Themen wie z.B. Einkaufen, Familie, Freunde, Wohnen, Kleidung wird gelernt und geübt.
Es werden Strategien vermittelt, die mündlich wie schriftlich eine Verständigung trotz geringer Sprachkenntnisse erlauben. 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 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 und allgemeinen Themen zu verstehen. Mündlich und schriftlich kann er/sie u.a. auf elementare Weise von Geschehnissen, Situationen und Gewohnheiten in der Vergangenheitsform erzählen; Personen beschreiben (Charakter- und Körpereigenschaften); höfliche Aufforderungen, Wünsche, Vermutungen ausdrücken; Ratschläge bzw. Anweisungen geben; Entscheidungen kurz begründen; die eigene Meinung äußern. Er/sie kann grundlegendes Vokabular zu Themen wie Familie und Verwandtschaft, Kleidung, Wohnen, Ernährung 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; 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+A2.2 - Intensiv (Seminar, 4 SWS)
Mainardi D, Schmidt C
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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 or here.

Module Description

SZ0602: Italian A1.1 | Italienisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, Taddia E, Togni M, Villadei M, Zangrilli D

Blockkurs Italienisch A1.1 (Seminar, 2 SWS)
Schmidt C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0602: Italian A1.1 | Italienisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, Taddia E, Togni M, Villadei M, Zangrilli D

Blockkurs Italienisch A1.1 (Seminar, 2 SWS)
Schmidt C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0605: Italian A1.2 | Italienisch A1.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 undirekte 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 or here.

Module Description

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

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** irregularly
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 Kommunkationspraxis 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 or here.

Module Description

SZ1304: Hebrew A1.1 | Hebräisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 allgemeinsprachlicher 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:
Hebräisch A1.1 (Seminar, 2 SWS)
Weidemann T
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1305: Hebrew A1.2 | Hebräisch A1.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 or here.

Module Description

WI001122: Introduction to Business Law (MiM) | Introduction to Business Law (MiM) [BusLawMiM]

Version of module description: Gültig ab summerterm 2021

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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 - Lecture (Vorlesung, 2 SWS)
Haag A, Jung S

Introduction to Business Law (WI001122, englisch): Exercise (MiM) (Übung, 2 SWS)
Haufellner M

Introduction to Business Law (WI001122, englisch) (MiM) (Vorlesung, 2 SWS)
Maume P

Introduction to Business Law (WIHN1122) MIM Heilbronn - Exercise (Übung, 2 SWS)
Siebeck C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0705: Japanese A1.1 | Japanisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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:
Japanisch A1.1 (Seminar, 2 SWS)
Bauer K, Gottschalk H, Miyayama-Sinz M, Murakami N, Stinner-Hasegawa Y

Blockkurs Japanisch A1.1 (Seminar, 2 SWS)
Gottschalk H, Murakami N
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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)
Ishikawa-Vetter M, Murakami N
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1808: Korean A1.1 | Koreanisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1809: Korean A1.2 | Koreanisch A1.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 abgeschlossene Stufe A1.2

Content:
In diesem Modul werden weitere Grundkenntnisse in der Fremdsprache Koreanisch vermittelt, die den Studierenden ermöglichen, sich in alltäglichen Grundsituationen zurechtzufinden. Dabei werden interkulturelle und landeskundliche Aspekte berücksichtigt. Die Studierende lernen/üben (u. a.) Konsekutivsatz (um … zu), Richtungs- und Kausalpartikel, Präpositionen: oben, unten, vor, hinter, neben, innen, außen, zwischen, links und rechts, Hilfsverben (mögen, wollen, können), Futurform, Partizip Präsens/Attributives Adjektiv, Konjugationsform von Adjektiv-Verben, Honorativ und Imperativ, Wegbeschreibung, Reiseplan, Briefschreiben, Shopping, Internetbestellung.

Intended Learning Outcomes:
Das Modul orientiert sich am Niveau A2.1 des GER. Nach der Teilnahme an der Modulveranstaltung sind die Studierende in der Lage Sätze und häufig gebrauchte Ausdrücke zu verstehen, die mit Bereichen von ganz unmittelbarer Bedeutung zusammenhängen. Sie können

sich in routinemäßigen Situationen verständigen, in denen es um einen direkten Austausch von Informationen über vertraute und geläufige Themen geht.

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

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:
Koreanisch A1.2 (Seminar, 2 SWS)
Kim Y
For further information in this module, please click campus.tum.de or here.

Module Description

MCTS0036: Moderation (RESET) | Moderation (RESET)

How to guarantee efficient group discussions and moderation

Version of module description: Gültig ab winterterm 2021/22

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 68	**Contact Hours:** 22

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

Description of Examination Method:
Students must submit a research paper (2000 to 3000 words) in which they demonstrate that they have gained a deeper understanding of successful moderation. They do so by analysing a case or reflecting their own and other´s communication patterns and behaviour in group discussions and moderation situations. In the paper, students demonstrate that they have acquired a greater awareness for communication challenges and barriers with different stakeholders, as well as an empathic and also assertive communication attitude. Furthermore, they show that they are able to apply effective communication techniques for the creation and maintenance of respectful and results-oriented group discussions, and also to learn from experience and - if necessary or advisable - to modify critical group communication patterns.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
This Skills module is aimed at students currently enrolled in the M.A. program 'Responsibility in Science, Engineering and Technology'. Students from other English-language MA programs can apply to join the respective course provided there is sufficient space available.

Content:
It is a major challenge to communicate effectively with and to different stakeholders within the STS/RRI context (in project meetings, planning processes or field activities), especially when targeting the change of paradigms and behaviour. Involving different stakeholders such as fellow researchers and partners but also decision makers, entrepreneurs, and civil society in productive, interactive inter- and transdisciplinary meetings is a challenge and requires an informed and skilled intervention of the moderator. Relevant concepts for these interventions will be discussed and necessary skills will be trained.

Intended Learning Outcomes:
This module is dedicated to the challenges of successful communication in multi-stakeholder environments. Participants will acquire the following skills needed to support and moderate meetings and discussions (involving 3-20 participants) effectively and guarantee consistent outcomes:
- awareness for communication challenges and barriers with different stakeholders
- empathic and at the same time assertive communication attitude in moderation situations
- application of effective moderation techniques (e.g. active listening, rephrasing, question techniques, establishing rapport)
- ability to use these techniques for the creation and maintenance of respectful and result-oriented group discussions
- ability to learn from experience and - if necessary or advisable - to modify critical group communication patterns

Teaching and Learning Methods:
Lectures to transfer knowledge about moderation and mediation; interactive exercises and simulations (role plays) to train group communication and moderation techniques

Media:
Whiteboard, flip chart, exercise sheets, exercises, role plays, films

Reading List:
MOORE, Ch. (2014). The Negotiating Process - Practical Strategies for Resolving Conflict.- 4th revised Edition; Jossey-Bass Publishers. San Francisco, CA, USA.
FISHER, R. & Ury, W. (2012). Getting To Yes: Negotiating Agreement Without Giving In. 3rd revised Edition (1st Ed. 1983). Penguin Books. New York, NY, USA.
SCHULZ v. THUN, F. (2004) Seven Tools for Clear Communication: The Hamburg Approach in English Language; Arbeitsgruppe Beratung und Training, Fachbereich Psychologie; 69 p.

Responsible for Module:
Bauer, Victoria; M.A.

Courses (Type of course, Weekly hours per semester), Instructor:
Facilitation Skills for Transdisciplinary Work Processes (Workshop, 1,5 SWS)
Schmitt S (Valdes Stauber C)
For further information in this module, please click campus.tum.de or here.

Module Description

POL70045: Master Seminar Business Ethics | Masterseminar Wirtschaftsethik

Version of module description: Gültig ab summerterm 2015

Module Level: Master	**Language:** German/English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 30	**Contact Hours:** 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 stattfindendende 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 Präsenation 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:
(POL7004501) Masterseminar Wirtschaftsethik (Interacting with Bots and Robots: Opportunities and Ethical Challenges) (Seminar, 2 SWS)
Boch A, Lütge C

(POL7004501) Masterseminar Wirtschaftsethik (Interacting with Bots and Robots: Opportunities and Ethical Challenges) (Seminar, 2 SWS)
Boch A, Lütge C

(POL7004501) Masterseminar Wirtschaftsethik (Interacting with Bots and Robots: Opportunities and Ethical Challenges) (Seminar, 2 SWS)
Boch A, Lütge C

(POL7004501) Masterseminar Wirtschaftsethik (Interacting with Bots and Robots: Opportunities and Ethical Challenges) (Seminar, 2 SWS)
Boch A, Lütge C

(POL7004501) Masterseminar Wirtschaftsethik (Interacting with Bots and Robots: Opportunities and Ethical Challenges) (Seminar, 2 SWS)
Boch A, Lütge C

(POL7004501) Masterseminar Wirtschaftsethik (Interacting with Bots and Robots: Opportunities and Ethical Challenges) (Seminar, 2 SWS)
Boch A, Lütge C

(POL700458) Masterseminar Wirtschaftsethik: (Ethics of Artificial Intelligence) (Seminar, 2 SWS)
Boch A, Lütge C, Pires Bernardo Ramos Fontes A, Poszler F

(POL7004511) Masterseminar Wirtschaftsethik (AI Ethics in Practice) (Seminar, 2 SWS)
Lütge C, Poszler F

(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 or here.

Module Description

WZ1550: Mathematics for Economics | Mathematics for Economics

Version of module description: Gültig ab summerterm 2016

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 Mathemetical 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 or here.

Module Description

SZ1601: Dutch A1 | Niederländisch A1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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:
Niederländisch A1 (Seminar, 2 SWS)
Becker H
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1602: Dutch A2 | Niederländisch A2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 or here.

Module Description

SZ1701: Norwegian A1 | Norwegisch A1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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:
Norwegisch A1 (Seminar, 2 SWS)
Janes J
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1703: Norwegian B1 | Norwegisch B1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** irregularly
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 or here.

Module Description

WZ4009: Ecology of Mountain Forests | Ökologie des Gebirgswaldes

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** German	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 82.5	**Contact Hours:** 67.5

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

Description of Examination Method:
The module is completed with a ninety-minute written examination. Students should demonstrate that they can describe mountain-specific ecological conditions and derive consequences for mountain forest management.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
As the 2-day terrain exercise is an integral part of the module and involves walking on narrow paths in steep alpine terrain, all participants must have equipment suitable for such terrain and be confident enough to undertake such an ascent.

Content:
The module consists of a lecture series and a two-day exercise and is limited to 25 participants for safety reasons.
In the lecture series, the lecturers of the module deal with various topics related to the ecology of mountain forests from the perspective of their respective research focus.
The module deals with the following aspects of mountain forest ecology:
- Climate
- geology
- geomorphology
- soils
- vegetation
- Physiology of mountain plants
- protective forest
- Ecosystem aspects of the Alps
- Classification of the Alps in the world's high mountain ranges

In a two-day field exercise, selected examples in the Northern Limestone Alps and the Silicate Central Alps will be used to illustrate important interdisciplinary relationships deepened in the modular lecture. The focus here is on the relationships between geology, landscape form, climate, soil, vegetation, and protective forest.

Intended Learning Outcomes:
After successfully completing the module, students will recognize the specific ecological conditions for forest growth in the mountains. They will be able to understand the special ecological framework conditions for forestry in the mountains in their interdependencies and evaluate their significance for forestry activities in mountain forests.

Teaching and Learning Methods:
The lecturers in lectures and presentations convey the contents of the lecture. In the exercise, the theoretical principles of the lecture are illustrated and deepened using concrete objects. Further information regarding the organization and procedure will be announced during the lecture.

Media:
PowerPoint, slides, blackboard work, work on the object in the field

Reading List:
Will be announced in the lecture.

Responsible for Module:
Göttlein, Axel; Prof. Dr. rer. nat. habil. Dr. rer. silv.

Courses (Type of course, Weekly hours per semester), Instructor:
Ökologie des Gebirgswaldes (Vorlesung, 3 SWS)
Göttlein A, Häberle K, Kolb E, Lüpke M

Exkursion Ökologie des Gebirgswaldes (Übung, 1,5 SWS)
Kolb E [L], Göttlein A, Häberle K, Kolb E
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0801: Portuguese A1 | Portugiesisch A1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, plurilingualer 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)
Paiva Pissarra R, Santiago da Silva Lang R, Viegas Cunha R

Blockkurs Portugiesisch A1 (Seminar, 2 SWS)
Werkhausen R
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0808: Portuguese B1.2 | Portugiesisch B1.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 Studienumfeld 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 Lehrmaterialianen; 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 or here.

Module Description

SZ0809: Portuguese B1.1 | Portugiesisch B1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, plurilingualer, 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 geprobt. 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 Studienumfeld, 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 Lehrmaterialianen; 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 or here.

Module Description

WI000336: Policy of Landscape Development | Politik der Landschaftsentwicklung

Version of module description: Gültig ab winterterm 2023/24

Module Level:	Language:	Duration:	Frequency:
Master	German	one semester	winter semester
Credits:*	**Total Hours:**	**Self-study Hours:**	**Contact Hours:**
5	150	90	60

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

Description of Examination Method:
Das Modul wird mit einer mündlichen Prüfung abgeschlossen. Die Prüfungsdauer beträgt fünfundzwanzig Minuten. In der Prüfung weisen die Studierenden nach, dass sie in der Lage sind regionale Governance-Ansätze in der Landnutzung zu analysieren und geeignete Beteiligungsverfahren für die Governance-Strukturen zu entwickeln.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
keine

Content:
Die Politik der Landschaftsentwicklung ist durch vielfältige Konfliktkonstellationen geprägt. Diese lassen sich in klassische (Infrastruktur-)Planungen, Konflikte zwischen unterschiedlichen Landnutzern und Konflikte, die durch gesellschaftlichen Wandel (z.B. höhere Ansprüche des Naturschutzes) bzw. Wandel im Naturraum (z.B. Klimawandel, Rückkehr große Beutegreifer) angestoßen werden, einteilen. Hierbei stehen sich in einem sektoral gegliederten Mehrebenensystem Verwaltungen, die unterschiedliche Gemeinwohlziele vertreten, und vielfältige private Akteure gegenüber.
In der Veranstaltung Konflikte und Beteiligung werden die theoretischen Grundlagen für die Konfliktanalyse gelegt und darauf aufbauend die Möglichkeiten einer Stakeholder bzw. Bürgerbeteiligung zur Bearbeitung der Konflikte aufgezeigt. In der Politikfeldanalyse Landschaftsentwicklung werden die Theorien auf konkrete Fälle der Landschaftsentwicklung angewendet.
Lehr- und Lernmethode:

In dem Modul werden die theoretischen Grundlagen mittels Vortrag und Präsentation vermittelt und von den
Studierenden aus vorgelegten Texten erarbeitet. Ferner werden die Studierenden dazu angehalten, effektiv in
Gruppen vorgegebene Konflikte der Landschaftsentwicklung und der Landnutzung zu analysieren. Die studentischen Gruppen erarbeiten Workshopmodule, in denen sie ihre Analyse mit den anderen Studierenden teilen und Bearbeitungsansätze für die Konflikte erarbeiten.

Intended Learning Outcomes:
Die Studierenden sind in der Lage, Konflikte bezüglich der Landschaftsentwicklung zu analysieren und eigenständig geeignete Stakeholder- und Bürgerbeteiligungsverfahren zu entwerfen.

Teaching and Learning Methods:
In dem Modul werden die theoretischen Grundlagen mittels Vortrag und Präsentation vermittelt und von den Studierenden aus vorgelegten Texten erarbeitet. Ferner werden die Studierenden dazu angehalten, effektiv in Gruppen zusammen zu arbeiten und ihre Ergebnisse wirkungsvoll zu präsentieren. Im Anschluss werden diese Grundlagen von den Studierenden auf vorgegebenen Themen der Landschaftsentwicklung und der Landnutzung angewendet.

Media:
Powerpoint, Tafelarbeit, Fachliteratur, flip chart

Reading List:

Responsible for Module:
Suda, Michael; Prof. Dr. rer. silv.

Courses (Type of course, Weekly hours per semester), Instructor:
Konflikte und Beteiligung (WI000336, deutsch) (Vorlesung, 1 SWS)
Pukall K [L], Pukall K

Politikfeldanalyse Landschaftsentwicklung (WI000336, deutsch) (Vorlesung, 3 SWS)
Pukall K [L], Pukall K
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2398: Practical Ecotoxicology | Praktische Ökotoxikologie

Version of module description: Gültig ab summerterm 2015

Module Level: Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 75

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

Description of Examination Method:
Die Prüfungsleistung wird in Form einer wissenschaftlichen Ausarbeitung (ca. 10-15 Seiten) erbracht. Die Arbeit wird im Stil einer wissenschaftlichen Veröffentlichung verfasst und dient der Kontrolle des Verständnisses sowie der Fähigkeit zur Beschreibung, Auswertung und Interpretation der im Praktikum erzielten Ergebnisse. Die Studierenden zeigen in der Ausarbeitung, dass sie die Risikobewertung von Umweltstressoren mittels komplexer Testsysteme (Mesokosmenstudie, Aquarienversuche) sowie die Planung, den Aufbau, die Durchführung und die Auswertung ökotoxikologiescher Testverfahren verstehen. Sie zeigen zudem, dass sie Zooplankton- und Makroinvertebratenproben qualitativ und quantitativ auswerten, ökosystemare Zusammenhänge erkennen und die verschiedenen Effektarten und deren Auswirkungen auf die verschiedenen Trophieebenen benennen können.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
förderlich wären Lehrveranstaltungen zu ökotoxikologischen und/oder limnologischen Themen

Content:
Das Modul beinhaltet:
- Mesokosmenstudien
- Aquarienversuchen
- Untersuchungsmethoden zur ökotoxikologischen Bewertung von Umweltstressoren
- Erfassung physikalischer und biologischer Parameter und deren qualitative und quantitative Auswertung
- Auswertung der erhobenen Daten mit gängigen statistischen Auswertungsmethoden (uni- und multivariate Statistik) und Bestimmung der verschiedenen Bewertungsendpunkte(NOEC).

Intended Learning Outcomes:
Nach erfolgreicher Teilnahme an dem Modul verstehen die Studierenden die Risikobewertung von Umweltstressoren mittels komplexer Testsysteme (Mesokosmenstudie, Aquarienversuche). Sie verstehen die Planung, den Aufbau, die Durchführung und die Auswertung ökotoxikologiescher Testverfahren. Sie kennen die Taxonomie von Zooplankton und Makroinvertebraten und sind in der Lage, Zooplankton- und Makroinvertebratenproben qualitativ und quantitativ auszuwerten. Sie sind in der Lage, ökosystemare Zusammenhänge zu erkennen und die verschiedenen Effektarten und deren Auswirkungen auf die verschiedenen Trophieebenen zu benennen. Sie kennen und verstehen die gängigen ökotoxikologischen statistischen Auswertungsmethoden (multivariat und univariat) und die Bestimmung ökotoxikologischer Endpunkte.

Teaching and Learning Methods:
Das Modul wird in Form eines Praktikums abgehalten. In einführenden Vorlesungen werden die Grundlagen mittels Vorträgen vermittelt.
Der eigentliche Schwerpunkt dieses Moduls sind die anschließenden praktischen Tätigkeiten in Freiland und Labor unter Anleitungsgesprächen, während denen die Studierenden durch selbstständiges Arbeiten die erlernten Methoden in Teamarbeit anwenden.

Media:
Folien, Lehrmaterial

Reading List:
Fent (2007): Ökotoxikologie, Georg Thieme Verlag
Orginalliteratur

Responsible for Module:
Geist, Jürgen; Prof. Dr. rer. nat.

Courses (Type of course, Weekly hours per semester), Instructor:
Praktische Ökotoxikologie (Praktikum, 5 SWS)
Geist J [L], Beggel S, Kalis E
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2405: Phylogeny and Zoology of Vertebrates | Phylogenie und Zoologie der Vertebraten

Version of module description: Gültig ab winterterm 2022/23

Module Level: Master	**Language:** German	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 Klausur (90 min) erbracht. Die Prüfungsfragen gehen über den gesamten Vorlesungsstoff. Die Antworten erfordern eigene Formulierungen, Rechenaufgaben werden nicht gestellt.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Grundlegende Kenntnisse der Zoologie, Ökologie und Genetik sollten vorhanden sein.

Content:
Vorlesung: 1. Einführung in die Klassifizierung, Systematik und Taxonomie, 2. Grundlagen der Phylogenetik und phylogenetischen Rekonstruktion, 3. Micro- und Macroevolution, 4. Die Chordaten im Überblick, 5. Merkmale der Chordaten, Merkmale der Vertebraten, 6. Phylogenie und Zoologie der Fische, 7. Bauliche und funktionelle Anpassung der Fische, 8. Phylogenie und Zoologie der Amphibien, 9. Phylogenie und Zoologie der Reptilien 10. Merkmale der Reptilien vs Amphibien, 11. Phylogenie der Vögel, 12. Flug, Flugfähigkeit, Flugunfähigkeit, 13. Grundlagen der Physiologie, des Sozialverhalten und der Fortpflanzung der Vögel, 14. Evolution und Phylogenie der Säugetiere, 15. Bauliche und funktionelle Anpassung der Säugetiere, 16. Unsere frühen Vorfahren.

Seminar: Übung mit Vorträgen und Diskussion mit Themenbezug zu aquatischer und terrestrischen Ökologie und Naturschutzbiologie. Schwerpunkte liegen auf der Lösung wissenschaftlicher Probleme durch Möglichkeiten der Eingrenzung von Fragestellungen / Hypothesenformulierung, Versuchsplanung, Versuchsauswertung und Statistik, Darstellung und

Interpretation von Versuchsergebnissen, Präsentation von Ergebnissen, kritische Reflexion und Diskussion, Vorgehensweise bei wissenschaftlichen Veröffentlichungen und Recherchemethoden

Intended Learning Outcomes:
Nach Teilnahme des Moduls verstehen die Studenten die Unterschiede der Disziplinen in der Systematik und haben Einblick in die phylogenetische Rekonstruktion. Sie sind fähig die Artbildung der Vertebraten im micro- und macro evolutiven Kontext darzustellen und haben einen detaillierten Überblick zu deren Evolution und Phylogenie basierend auf ein interdisziplinäres Verständnis von Genetik, Evolution und Physiologie sowie Sozialverhalten und Fortpflanzung. Zudem erhalten die Studenten ein Verständnis von wissenschaftlichen Arbeitsweisen in den Bereichen Zoologie und Naturschutzbiologie und damit die Befähigung zur effizienten Planung und Durchführung eigenständiger Forschungsprojekte (z.B. im Rahmen einer Bachelor-, Master- oder Doktorarbeit).

Teaching and Learning Methods:
Veranstaltungsform/Lehrtechnik: Vorlesung
Lehrmethode: Präsentation, Vortrag, Fragend-entwickelnde Methode
Lernaktivitäten: Studium der ausgeteilten Grundlageninformationen, Nacharbeitung der vermittelten Informationen, Materialrecherche, Zusammenfassen von Dokumenten,

Media:
Ein Skript zu dieser Vorlesung wird ausgeteilt bzw. als Download auf Moodle zur Verfügung gestellt. Zusätzliche Informationen werden auf Moodle kommuniziert (URLs, weitere Texte)

Reading List:
Zoologie (CP Hickman) Spezielle Zoologie (Westheide)
Grundlagen der Phylogenetischen Systematik (Wägele) Evolutionsbiologie (V Storch)
Systematische Zoologie (Storch)

Responsible for Module:
Kühn, Ralph, Apl. Prof. Dr. agr. habil. ralph.kuehn@tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Wissenschaftliche Konzepte in aquatischer und terrestrischer Ökologie (Seminar, 2 SWS)
Kühn R

Phylogenie und Zoologie der Vertebraten (Vorlesung, 2 SWS)
Kühn R
For further information in this module, please click campus.tum.de or here.

Module Description

BV210013: Urban und Regional Planning | Stadt- und Regionalplanung

Version of module description: Gültig ab summerterm 2017

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 30

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

Description of Examination Method:
The 10-page report should have 4 sections. Each section must be related to one of the themes discussed in the class. The student must demonstrate with each section that they have gained knowledge of the reading material and discussions surrounding a particular topic in urban and regional planning. They must show that they are able to discuss different theoretical and case-based perspectives on urban and regional planning, and that they are able to reflect upon their own learning and position in these debates. The report must present the student's acquired knowledge on urban and regional planning in a structured way, and demonstrate their ability to analyse cases of urban and regional planning. Overall, the report should demonstrate that the student has understood essential aspects of urban and regional planning in theory and practice, and is able to present this knowledge in writing.
The written report will be complemented by a short 10-minute presentation (20%), through which the student will demonstrate their ability to communicate scholarly work to an audience, by presenting their main academic reflections on urban and regional planning to the class.
The final grade is a summation of grade from the report (80%) and the presentation (20%).

Repeat Examination:
Next semester

(Recommended) Prerequisites:

Content:
The aim of this course is to introduce students to key themes and debates in urban and regional planning. The course takes a generally critical and reflective approach, asking 'why' urban and regional planning is practised in certain ways, and encouraging critical discussion of contemporary planning cases. The course briefly introduces urban and regional planning, discussing the origins

and aims of planning, and developments in planning theory. The initial sessions will introduce questions about the changing roles of plans, form, processes and people in urban and regional planning, and the different perspectives these focus areas provide on the city. After this section of the course, the focus turns to a number of contemporary topics, which will be presented and discussed with case studies of different cities from around the world. These sessions will address questions such as the aims of planning and planning processes in different contexts, the role of identity in planning, and technology and planning. The cases used for discussion in the course will be drawn from an international research literature.

Intended Learning Outcomes:
Upon successful completion of this course, students are able to:
• Understand the foundation(s) and differing aims of urban and regional planning
• Explain key perspectives in urban and regional planning
• Apply key theories to case studies of urban and regional planning
• Analyse cases of urban and regional planning
• Critically discuss international literature on urban and regional planning
• Communicate knowledge about urban and regional planning orally and in text.
• Critically reflect on current developments and trends in urban and regional planning
• Reflect upon their own position in debates on urban and regional planning.

Teaching and Learning Methods:
The course is based around weekly interactive seminars, during which literature and case studies from urban and regional planning practice will be discussed. The lecturer will facilitate discussion between students through questions and group work, and short PowerPoint presentations with key points. Students are required to read and prepare for all the sessions, and to take an active part in class discussions. If for whatever reason you are not able to read and prepare for the sessions and actively participate in the seminars, signing up for this class is not recommended!

Media:
Various reading materials, including books, scientific articles, planning documents and websites. PowerPoint, whiteboard and exercise sheets may be used in sessions.

Reading List:

Responsible for Module:
Wulfhorst, Gebhard; Prof. Dr.-Ing.

Courses (Type of course, Weekly hours per semester), Instructor:
Stadt- und Regionalplanung (Seminar, 2 SWS)
Zimmer C, Nichols A, Haxhija S

For further information in this module, please click campus.tum.de or here.

Module Description

BV400016: Scientific Paper Writing | Selbständig wissenschaftlich Arbeiten

Version of module description: Gültig ab summerterm 2020

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 30

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

Description of Examination Method:
Students have to submit a scientific paper which will be assessed based on a number of standard criteria for a scientific paper. The students demonstrate with their papers that they have gained deeper knowledge of the specific requirements of a scientific paper, including structure, appropriate presentation of information and discussion as well as the related formalities. The students are able to develop a topic for their papers and formulate the problem statement, objectives and research questions. Furthermore, the students are able to develop a conceptual frame and present as well as analyze information and formulate conclusions. Finally, the students are able to meet the formalities of a scientific paper including proper quotations, layout and language.

Note in view of the limitations on university operations as a result of the CoViD19 pandemic: If the basic conditions (hygiene, physical distance rules, etc.) for a classroom-based examination cannot be met, the planned form of examination can be changed to a written or oral online examination in accordance with §13a APSO. The decision about this change will be announced as soon as possible, but at least 14 days before the date of the examination by the examiner after consultation with the board of examiners of the respective study program.

Repeat Examination:

(Recommended) Prerequisites:
none

Content:
1. Introduction into what constitutes a scientific paper and what not. How does a scientific paper differ from a technical or consultancy paper?
2. search ing and selecting literature.

3. Technical writing skills – structure and elements of an abstract, summary, position paper, essay
4. Formulating key problem statement and objectives for a research paper
5. Reading, understanding and reviewing research papers
6. Technical writing – macro-writing, outlining
7. Referencing and citing literature using referencing software
8. Technical writing – micro-writing and technical English
9. Technical writing - Use of frameworks in research papers
10. Executing Constructive peer reviews
11. Revising and improving papers

Intended Learning Outcomes:
At the end of the module the students understand the main steps to prepare, write, revise and review a scientific paper. More specifically, students are able to formulate a relevant problem statement, research objective and key method for a scientific paper and design an outline for such a paper. Furthermore, the students are able to write a scientific paper by presenting and following a clear line of argument, discussion and conclusions. The students are also able to identify scientifically valid sources of information and provide references in an given reference style using a reference software . Finally, the students are able to conduct collaborative work in an academic environment.

Teaching and Learning Methods:
The instruction is through participatory lectures, exercises and feedback to papers. Teaching method includes presentation and group discussion which help students to understand how to do a scientific research.

Media:
Presentations followed by discussion.

Reading List:
The module works with a background script in which different aspects of scientific paper writing are addressed.

Responsible for Module:
Walter T. de Vries wt.de-vries@tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Scientific Paper Writing (Vorlesung, 1 SWS)
de Vries W [L], de Vries W (Dachaga W)
For further information in this module, please click campus.tum.de or here.

Module Description

CIT3640001: Sanitätsausbildung | Sanitätsausbildung

Version of module description: Gültig ab winterterm 2022/23

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 15	**Contact Hours:** 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 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** irregularly
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 discoures 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:

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

For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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_Woisetschlaeger/
publication/317035913_Inferring_Corporate_Motives_How_Deal_Characteristics_Shape_Sponsorship_Percep
links/59916244458515b87b4d6b40/Inferring-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)

Moirano D

Sponsorship-linked marketing (Online-Kurs) (Vorlesung, 2 SWS)
Moirano D
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1001: Swedish A1 | Schwedisch A1

Version of module description: Gültig ab summerterm 2022

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

Blockkurs Schwedisch A1 (Seminar, 2 SWS)
Thunstedt C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1002: Swedish A2 | Schwedisch A2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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:
Schwedisch A2 (Seminar, 2 SWS)
Matyas E, Thunstedt C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1201: Spanish A1 | Spanisch A1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 Jimenez L, Listan Rosa M, Lopez Agudo E, Navarro Reyes A, Noch nicht bekannt N, Pardo Gascue F, Rey Pereira C, Rodriguez Garcia M, Zuniga Chinchilla L

Blockkurs Spanisch A1 (Seminar, 2 SWS)
Garcia Garcia M, Gomez Cabornero S, Pardo Gascue F, Rodriguez Garcia M
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1202: Spanish A2.1 | Spanisch A2.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, Listan Rosa M, Lopez Agudo E, Mayea von Rimscha A, Navarro Reyes A, Noch nicht bekannt N

Blockkurs Spanisch A2.1 (Seminar, 2 SWS)

Listan Rosa M, Lopez Paredes M
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1203: Spanish A2.2 | Spanisch A2.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, Iglesias Martin A, Lopez Paredes M, Martinez Wahnon A, Mayea von Rimscha A, Noch nicht bekannt N

Blockkurs Spanisch A2.2 (Seminar, 2 SWS)
Mayea von Rimscha A
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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)
Gonzalez Sainz C, Lopez Paredes M, Mayea von Rimscha A, Rey Pereira C
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** irregularly
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 or here.

Module Description

SZ1216: Spanish B1.2 | Spanisch B1.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, Lopez Paredes M, Zuniga Chinchilla L
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1217: Spanish B2.2 | Spanisch B2.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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)
Guerrero Madrid V, Nevado Cortes C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1218: Spanish B1.1 | Spanisch B1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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, Iglesias Martin A, Martinez Wahnon A, Navarro Reyes A, Nevado Cortes C, Noch nicht bekannt N

Blockkurs Spanisch B1.1 (Seminar, 2 SWS)
Galan Rodriguez F, Tapia Perez T
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1219: Spanish B2.1 | Spanisch B2.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 allgemeinsprachlichen 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)
Gomez Cabornero S, Hernandez Jimenez L
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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 or here.

Module Description

WZ1676: Sustainable Land Use and Nutrition | Sustainable Land Use and Nutrition

Version of module description: Gültig ab summerterm 2024

Module Level: Bachelor	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 60

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

Description of Examination Method:
Building on competences gained in case-specific lectures (literature analysis, systematic assessments of concepts) the students participate in a written exam (Klausur) and give an own presentation in the context of an interdisciplinary workshop. By answering the questions in the examination, the students show that they know the multi-facetted challenges of sustainable land use and nutrition and that they consider the whole supply chain. During the workshop (usually Friday + Saturday), students dive deeper in a specific aspect of sustainable land use and nutrition. They learn here how to prepare a scientific presentation, including literature search and how to present the results to an international audience. Talks on specific topics comprise 10 min per student plus 5 min discussion und questions per student, while the topics are generated from the case studies introduced during the lectures. The students also demonstrate that they are able to analyze a given topic based on existing literature. In the written examination (90 min) at the end of the semester students demonstrate the theoretical knowledge of the various perspectives of sustainable land use and nutrition by answering questions under time limitations and without helping material.
The final grade is a combined grade from the written examination (40 %) and from the presentation (60 %).

Repeat Examination:
End of Semester

(Recommended) Prerequisites:

Content:
The module provides an overview on the various perspectives of sustainable land use and nutrition. An introduction establishes the structure of the module, which follows a supply chain: 1)

The production of commodities addresses: availability of soil resources; sustainable environmental systems; ecology and biodiversity; animal sciences in food security; integrative and optimized land-use concepts; production technology. 2) The distribution of commodities (transport, storage) is analyzed under the aspects of resource economics. 3) The distribution through trade and services discusses sustainable marketing concepts. 4) Finally, consumer affairs are addressed by food chemistry and health aspects in the context of global nutrition; food safety; new designed food.

Intended Learning Outcomes:
The students know about the great variety of sustainability aspects in land use and nutrition. They understand the preconditions to understand the complexity and interconnectedness of multiple sectors. Students can name the barriers to achieve sustainable land use and nutrition, but can also describe strategies to improve sustainability. They are able to reproduce sustainability concepts, analyze their appropriateness and develop them for application to new problems. They understand that only a comprehensive perspective will lead to sustainable concepts for land use and nutrition.

Teaching and Learning Methods:
Students learn and discuss along a supply chain about specific challenges to sustainable land-use and nutrition. Case-specific lectures are furnished with up to date case-study papers, the students have to analyse and interpret. Based on the competences gained, they prepare own studies/presentations on a selection of topics, which they then present on a 2-days workshop to their teachers and colleagues.

Media:
PowerPoint, research literature on moodle, Handouts

Reading List:
Each lecturer provides a list of articles regarding his/her topic on moodle and also during the lecture itself.

Responsible for Module:
Knoke, Thomas; Prof. Dr. rer. silv.

Courses (Type of course, Weekly hours per semester), Instructor:
Sustainable Land Use and Nutrition (Vorlesung, 4 SWS)
Knoke T [L], Abate Kassa G, Eisner P, Hauner J, Just C, Knoke T, Langowski H, Leonhardt S, Regler F, Schad P, Sproten R, Stark T, Steinhoff-Wagner J, Zare M
For further information in this module, please click campus.tum.de or here.

Module Description

CLA20210: Philosophy of Technology | Technikphilosophie

Version of module description: Gültig ab winterterm 2003/04

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 30	**Contact Hours:** 30

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

Description of Examination Method:
Präsentation (30 min.), in der die Studierenden zeigen, dass sie in der Lage sind, auf Grundlage eines Textes ein technikphilosophisches Problem zu identifizieren und mit Bezug zum eigenen Fach wie zu aktuellen Kontexten zu diskutieren.

Repeat Examination:
Next semester

(Recommended) Prerequisites:

Content:
Technikphilosophie fragt nach dem, was Technik ist, wie technische Gebilde entstehen können und welche Folgen deren Verwendung hat. Das Modul bietet eine Einführung in folgende Themenfelder:
1. Mensch - Technik - Natur
2. Wissenschaft und Technik
3. Kultur der Technik
4. Technik und Ethik

Intended Learning Outcomes:
Die Teilnehmer sind in der Lage, philosophische Probleme der Technik zu verstehen und einen Text insbesondere auf den implizierten Technikbegriff hin zu analysieren. Zudem verfügen sie über Erfahrungen in der interdisziplinären Vermittlung und Reflexion fachspezifischen Wissens.

Teaching and Learning Methods:
Textbasiertes Seminar, Referate, Diskussionen, Gruppenarbeit, Selbststudium insbes. Lektüre/ Erarbeitung von Texten, Online-Forum

Media:

Reading List:
Thomas Zoglauer (Hg.): Technikphilosophie, Freiburg/München 2002, ISBN 9783495480106.
Alfred Nordmann: Technikphilosophie zur Einführung, Hamburg 2008, ISBN 9783885066576

Responsible for Module:
Fred Slanitz

Courses (Type of course, Weekly hours per semester), Instructor:
Technikphilosophie - Texte zur Einführung (Seminar, 2 SWS)
Slanitz A
For further information in this module, please click campus.tum.de or here.

Module Description

ED0151: Philosophy of Technology (Advanced Topics) | Technikphilosophie (vertieft)

Version of module description: Gültig ab winterterm 2013/14

Module Level: Master	**Language:** German	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 135	**Contact Hours:** 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:
Mensch, Maschine und Interaktion (Subversive und konstruktive Beziehungen zwischen Mensch und Maschine) (Seminar, 1,5 SWS)
Slanitz A, Tremmel S
For further information in this module, please click 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 winterterm 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 60	**Contact Hours:** 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 and www.tms.tum.de.

Intended Learning Outcomes:
After participating in the module “Think.Make.Start.” the students are able to
- reproduce the principles of user-centered design
- apply methods of product development (e.g., Design Thinking) to a challenge of their choice
- develop important hypotheses involving relevant stakeholders (customer, user, ...) through proper planning with "purposeful prototyping"
- examine the relevance of a problem and develop a solution collaboratively in an interdisciplinary team
- design a prototype based on the acquired design methods and analyzed insights
- 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, Miroslaw / 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, Jeffry A. / Spinelli, Stephen (2009): New Venture Creation, 7thedition, 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], Tong Y, Hohnbaum K, Reif M, Büchner B, McTeague C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1402: Turkish A2.1 | Türkisch A2.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** irregularly
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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:
Gesicherte Kenntnisse der Stufe A1.2

Content:
Aufbauend auf die Grundkenntnisse aus A1 und unter Einbeziehung interkultureller und landeskundlicher Aspekte und der fortdauernden Modernisierung der türkischen Sprache werden in diesem Modul das Hörverstehen trainiert und vertieft und die Verflüssigung der Ausdrucksfähigkeit im aktiven Sprechen gefördert. Der Übungsschwerpunkt liegt in der richtigen Auswahl und Anreihung der Agglutinationen, der Endungsanalyse beim Hören und Lesen von Informationen. Die Studierenden lernen/üben Imperativ, Vergangenheit, Zukunft, Verneinung und Fragesätze zu formulieren und verstehen. Themen aus dem alltäglichen Leben wie Kochen, Freizeit, Nachrichten, Wetter und Aktivitäten planen erweitern den Wortschatz.

Intended Learning Outcomes:
Dieses Modul orientiert sich am Niveau "A2.1 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.

Die Lernenden erfassen die Bedeutung von klaren und deutlich artikulierten Mitteilungen. Der Austausch von In-formationen erfolgt kurz, aber mühelos zu vertrauten Tätigkeiten und Themen. Der/die Studierende ist in der Lage mithilfe feststehender Wendungen kurze, informative Texte zu verstehen, mündlich wie schriftlich zu wiedergeben und zu verfassen.

Teaching and Learning Methods:
Kommunikatives und handlungsorientiertes Erarbeiten der Inhalte; Dialogübungen; gezielte Hör-, Sprech-, Lese- und Schreibübungen; Einzel-, Partner- und Gruppenarbeit; Förderung kooperativen Lernens; Referat; kontrolliertes Selbstlernen 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:
Türkisch A2.1 (Seminar, 2 SWS)
Kardes Alper T
For further information in this module, please click campus.tum.de or here.

Module Description

SZ1404: Turkish A1.1 | Türkisch A1.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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:
Türkisch A1.1 (Seminar, 2 SWS)
Kardes Alper T
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2760: The Great Transformation - Approaches to and Examples of Transformational Change in Business & Society | The Great Transformation - Approaches to and Examples of Transformational Change in Business & Society

Version of module description: Gültig ab summerterm 2017

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 95	**Contact Hours:** 55

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

Description of Examination Method:
The assessment is based on an oral group presentation and a seminar paper.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
A basic understanding of sustainability science.

Content:
According to the WBGU a comprehensive transition is defined as “to take the → planetary guard rails into account as a Great Transformation requiring the modification of both the national and the global economy within these guard rails in order to avoid irreversible damages to the Earth system and its ecosystems, and the impact of the damages on humankind.” (Wissenschaftlicher Beirat Globale Umweltveränderungen 2011b, S. 393). In this one-week long seminar, first the students will be theoretically introduced to the topic of the Great Transformation. In this context, both the current discussion about the Great Transformation as well as the different approaches of the transformation towards sustainability will be part of the seminar. Regarding the latter, on the scientific level transformative science, and on the conceptual/practical level transformation design and the economy for the common good will be presented and critically analyzed as well as evaluated. Transferring this theoretical knowledge into practice will be achieved through field trips to regional transformation projects.
Day*
Content
1

- Introduction round (in the morning)
- Discussion round – discussion stimulus: „Do we have to preserve our world for upcoming generations?“ (Schwinn 2015) (in the morning)
- Topics: critical thinking and analyzing; Introduction to the Great Transformation; Current discussion about the Great Transformation (in the morning and in the afternoon)
2
- Topics: transformative science; Project examples for transformative science (in the morning)
- Field trip 1 (in the afternoon)
3
- Critical reflection of transformative science and field trip 1 (in the morning)
2
- Topics: transformation design; Practical examples transformation design (in the morning)
- Field trip 2 (in the afternoon)
4
- Critical reflection of transformation design and field trip 2 (in the morning)
- Topics: Economy for the common good; Practical examples economy for the common good (in the morning)
- Field trip 3 (in the afternoon)
5
- Critical reflection of the economy for the common good and field trip 3 (in the morning)
- Preparation of group presentations for the respective field trip (in the afternoon)
6
- Group presentations (in the morning)
- Reflection of the entire seminar (in the morning)
- Information regarding the seminar paper (in the morning)
*Days 1 - 5: 8:30 a.m. to 12:30 p.m. and 1:30 p.m. to 6:30 p.m.
*Day 6: 08:30 a.m. to 1:30 p.m.

Intended Learning Outcomes:
At the end of the seminar, students are able to:
1.) understand the origins of the Great Transformation
2.) understand the scope of the Great Transformation and the general approaches of the transformation towards sustainability
3.) use basic critical thinking techniques
4.) understand transformation concepts and projects and critically analyze as well as evaluate them (e.g. Common Good Balance Sheets and Reports)
5.) understand the transition of transformation concepts into practice and consequently design transformation projects
6.) suggest possible ideas of improvement

Teaching and Learning Methods:
The module will include lectures, group discussions, group work, case presentations, field trips and reading assignments (also some home reading).

Media:
PowerPoint, board, flip chart, handouts, video.

Reading List:
Wissenschaftlicher Beirat Globale Umweltveränderungen (2011): World in transition. A social contract for sustainability; with 62 figures. Berlin: WBGU.
Felber, Christian (2015): Change Everything. Creating an economy for the common good. London: Zed Books.

Responsible for Module:
Prof. Dr. Michael Suda – Lehrstuhl für Wald- und Umweltpolitik (Arbeitsbereich Umweltgovernance) - Hans-Carl-v.-Carlowitz-Platz 2 85354 Freising

Courses (Type of course, Weekly hours per semester), Instructor:
Course
The Great Transformation - Approaches to and examples of transformational change in business & society
Lecturer
Heike Pöschl
Form of Teaching
Seminar
For further information in this module, please click campus.tum.de or here.

Module Description

WZ0528: Urban Forestry | Urban Forestry

Version of module description: Gültig ab winterterm 2023/24

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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; Prof. Dr. agr. habil.

Courses (Type of course, Weekly hours per semester), Instructor:
Urban Forestry (Vorlesung mit integrierter Übung) (Vorlesung, 4 SWS)
Rötzer T, Pauleit S, Reischl A, Rahman M, Torano Caicoya A, Lupp G
For further information in this module, please click campus.tum.de or here.

Module Description

CLA11207: Understanding Art 1: Art Reception infront of Originals in Museums in Munich | Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 15	**Contact Hours:** 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:
Selfie im Pelzrock? Portraits aus fünf Jahrhunderten (Seminar, 1 SWS)
Glardon C
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0504: French A2.2 | Französisch A2.2

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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)
Delavigne C, Kirchhoff A, Paul E, Perconte-Duplain S
For further information in this module, please click campus.tum.de or here.

Module Description

SZ0806: Portuguese A2.1 | Portugiesisch A2.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 ausdrucken.
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 or here.

Module Description

SZ1207: Spanish A1 + A2.1 | Spanisch A1 + A2.1

Version of module description: Gültig ab summerterm 2022

Module Level: Bachelor/Master	**Language:** Language taught	**Duration:** one semester	**Frequency:** irregularly
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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, Austausche 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 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

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

For further information in this module, please click campus.tum.de or here.

Module Description

WI001208: Introduction to Value Chain Economics | Introduction to Value Chain Economics

Version of module description: Gültig ab winterterm 2020/21

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

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

Description of Examination Method:
The examination will be a written report (10-12 pages) with presentation (20-30 minutes).
Weighting: report 40% and presentation 60% of the grade.
The students show by means of the report whether they are able to analyze a value chain. In doing so, they apply the taught basics of the economics of value chains and structure the essential aspects on the basis of concrete questions.
With the presentation, students show whether they are able to explain the basic economic mechanisms, strategies and concepts of modern food value chains.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Basic knowledge of business administration and economics; Module “Introduction to Economics”.

Content:
The course provides a basic understanding of how modern food value chains are continually improving their competitiveness by producing high-quality food and striving for more sustainability.
Some of the topics covered are:
• Challenges and trends in food value chains
• The concept of quality and quality standards for food and agricultural products
• Vertical coordination in the agri-food sector
• The concept of value chains and the distribution of added value
• Different pricing strategies including psychological pricing
• Marketing strategies, market segmentation and brand personalities
• The use of sustainability by companies as a competitive advantage
• Asymmetric information, adverse selection, moral hazard and market failure

• Innovation and its types, drivers and obstacles in the agri-food sector

Intended Learning Outcomes:
After completing this module, students will be able to:
(1) Reflect on the main pricing strategies and their conditions
(2) Understand the challenges and trends in food value chains
(3) Explain the importance of quality and vertical coordination in the agri-food sector
(4) Describe the concept of value chains and their relevance to businesses, governments and NGOs
(5) Understand marketing strategies, market segmentation and brand personalities
(6) Explain the concept of corporate social and environmental responsibility
(7) Explain the concepts of asymmetric information, adverse selection, moral hazard and market failure
(8) Identify the innovation drivers and barriers in the agri-food sector

Teaching and Learning Methods:
Lectures with integrated tutorial exercises.
The lectures provide the necessary theoretical and methodological knowledge on the economics of food value chains, which is needed to understand and explain the challenges, strategies and concepts inherent in value chains. The integrated tutorial exercises are a suitable teaching method to link and deepen the knowledge gained in the lectures to practical examples from the food sector.

Media:
Educational tools include: PowerPoint presentations, handouts, videos, and exercises with solutions

Reading List:
Milgrom, P. und Roberts, J.: Economics, Organization & Management, 1992, Prentice Hall, New Jersey
Relevant literature will be handed out during the lecture.

Responsible for Module:
Menapace, Luisa; Prof. Ph.D.

Courses (Type of course, Weekly hours per semester), Instructor:
Introduction to Value Chain Economics (WI001208, englisch) (Vorlesung mit integrierten Übungen, 4 SWS)
Menapace L [L], Gärtner S
For further information in this module, please click 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

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

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

Description of Examination Method:
In 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), zusätzlich schriftlich Reflexion der Inhalte (Essay).

Media:

Reading List:

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:
Kommunikation und Präsentation - Innenstadt (Workshop, 2 SWS)
Zeus R
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German/English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 38	**Contact Hours:** 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:
LLMs and Human Language Use - Philosophical Questions Concerning Contemporary AI (Seminar, 2 SWS)
Durt C

Mensch, Maschine und Interaktion (Subversive und konstruktive Beziehungen zwischen Mensch und Maschine) (Seminar, 1,5 SWS)
Slanitz A, Tremmel S
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 15	**Contact Hours:** 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 or here.

Module Description

MCTS0036: Moderation (RESET) | Moderation (RESET)

How to guarantee efficient group discussions and moderation

Version of module description: Gültig ab winterterm 2021/22

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 68	**Contact Hours:** 22

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

Description of Examination Method:
Students must submit a research paper (2000 to 3000 words) in which they demonstrate that they have gained a deeper understanding of successful moderation. They do so by analysing a case or reflecting their own and other´s communication patterns and behaviour in group discussions and moderation situations. In the paper, students demonstrate that they have acquired a greater awareness for communication challenges and barriers with different stakeholders, as well as an empathic and also assertive communication attitude. Furthermore, they show that they are able to apply effective communication techniques for the creation and maintenance of respectful and results-oriented group discussions, and also to learn from experience and - if necessary or advisable - to modify critical group communication patterns.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
This Skills module is aimed at students currently enrolled in the M.A. program 'Responsibility in Science, Engineering and Technology'. Students from other English-language MA programs can apply to join the respective course provided there is sufficient space available.

Content:
It is a major challenge to communicate effectively with and to different stakeholders within the STS/RRI context (in project meetings, planning processes or field activities), especially when targeting the change of paradigms and behaviour. Involving different stakeholders such as fellow researchers and partners but also decision makers, entrepreneurs, and civil society in productive, interactive inter- and transdisciplinary meetings is a challenge and requires an informed and skilled intervention of the moderator. Relevant concepts for these interventions will be discussed and necessary skills will be trained.

Intended Learning Outcomes:
This module is dedicated to the challenges of successful communication in multi-stakeholder environments. Participants will acquire the following skills needed to support and moderate meetings and discussions (involving 3-20 participants) effectively and guarantee consistent outcomes:
- awareness for communication challenges and barriers with different stakeholders
- empathic and at the same time assertive communication attitude in moderation situations
- application of effective moderation techniques (e.g. active listening, rephrasing, question techniques, establishing rapport)
- ability to use these techniques for the creation and maintenance of respectful and result-oriented group discussions
- ability to learn from experience and - if necessary or advisable - to modify critical group communication patterns

Teaching and Learning Methods:
Lectures to transfer knowledge about moderation and mediation; interactive exercises and simulations (role plays) to train group communication and moderation techniques

Media:
Whiteboard, flip chart, exercise sheets, exercises, role plays, films

Reading List:
MOORE, Ch. (2014). The Negotiating Process - Practical Strategies for Resolving Conflict.- 4th revised Edition; Jossey-Bass Publishers. San Francisco, CA, USA.
FISHER, R. & Ury, W. (2012). Getting To Yes: Negotiating Agreement Without Giving In. 3rd revised Edition (1st Ed. 1983). Penguin Books. New York, NY, USA.
SCHULZ v. THUN, F. (2004) Seven Tools for Clear Communication: The Hamburg Approach in English Language; Arbeitsgruppe Beratung und Training, Fachbereich Psychologie; 69 p.

Responsible for Module:
Bauer, Victoria; M.A.

Courses (Type of course, Weekly hours per semester), Instructor:
Facilitation Skills for Transdisciplinary Work Processes (Workshop, 1,5 SWS)
Schmitt S (Valdes Stauber C)
For further information in this module, please click campus.tum.de or here.

Module Description

CLA10029: Writer's Lab | Writer's Lab

Version of module description: Gültig ab winterterm 2012/13

Module Level: Bachelor/Master	**Language:** German/English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 22	**Contact Hours:** 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:
How to chatGPT. A Writer's Lab - Scriptorium (Workshop, ,5 SWS)
Uecker K
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 15	**Contact Hours:** 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
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 23	**Contact Hours:** 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, Rummeld-Rodenbach M
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 22	**Contact Hours:** 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 Eucation, Harlow.
"

Responsible for Module:
Monika Thiel

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

For further information in this module, please click campus.tum.de or here.

Module Description

CLA10714: Human Resources Development | Personalentwicklung

Version of module description: Gültig ab winterterm 2013/14

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 15	**Contact Hours:** 15

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

Description of Examination Method:
Die Studierenden zeigen in einer Präsentation (10-15 Min.), dass sie die Prinzipien einer nachhaltigen Personalentwicklung verstehen (Prüfungsleistung).

Repeat Examination:

(Recommended) Prerequisites:

Content:
Langfristig erfolgreiche Unternehmen zeichnen sich durch eine nachhaltige Personalpolitik aus, die konsequent an Werten und Prinzipien ausgerichtet ist. Die Personalentwicklung gestaltet und unterstützt diesen Prozess.

Die einzelnen Themen sind
- Kennzeichen nachhaltig erfolgreicher Unternehmen
- Praxisbeispiele nachhaltiger Unternehmungsführung
- Kernprozesse der Personalarbeit
- Instrumente und Verfahren der Personalentwicklung
- Diversity
- Demographie
- Fallstudie: Strategieumsetzung durch Personalmaßnahmen"

Intended Learning Outcomes:
Nach erfolgreicher Teilnahme am Workshop verstehen die Studierenden die Prinzipien einer nachhaltigen Personalentwicklung im Spannungsfeld von Leistung und Humanität. Sie können

wichtige Methoden zur Entwicklung von leistungsstarken Mitarbeitern und die Bedeutung der Führungskraft darstellen und mit konkreten Beispielen illustrieren.

Teaching and Learning Methods:
Lehrvortrag, Diskussion, Gruppenarbeit mit Präsentation; realistische Fallstudie mit praxisnahen Übungen zur Personalentwicklung

Media:

Reading List:

Responsible for Module:

Courses (Type of course, Weekly hours per semester), Instructor:
Personalentwicklung (Konzepte einer nachhaltigen und leistungsstarken Unternehmensentwicklung) (Workshop, 1 SWS)
Turbanski J
For further information in this module, please click campus.tum.de or here.

Module Description

CLA10716: Positions of Modern Design | Positionen des modernen Designs

Version of module description: Gültig ab summerterm 2002

Module Level:	Language:	Duration:	Frequency:
Credits:* 1	**Total Hours:**	**Self-study Hours:**	**Contact Hours:**

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 (The International Design Museum Munich) (Workshop, ,5 SWS)
Rehwagen U
For further information in this module, please click campus.tum.de or here.

Module Description

CLA10813: Economic Thinking: Economics | Volkswirtschaftlich Denken

Version of module description: Gültig ab winterterm 2010/11

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 15	**Contact Hours:** 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 or here.

Module Description

CLA11207: Understanding Art 1: Art Reception infront of Originals in Museums in Munich | Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen

Version of module description: Gültig ab summerterm 2023

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 15	**Contact Hours:** 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:
Selfie im Pelzrock? Portraits aus fünf Jahrhunderten (Seminar, 1 SWS)
Glardon C
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** irregularly
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 7	**Contact Hours:** 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 or here.

Module Description

CLA11313: Conflict Management and Conducting Discussions | Konfliktmanagement und Gesprächsführung

Version of module description: Gültig ab summerterm 2015

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 8	**Contact Hours:** 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 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

Module Level: Bachelor/Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 15	**Contact Hours:** 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:
Cities of Change: Unleashing the Power of Sustainable Solutions (Ringvorlesung Umwelt)
(Vorlesung mit integrierten Übungen, 1,5 SWS)
Nogueira de Carvalho M, Reim L, Slanitz A
For further information in this module, please click campus.tum.de or here.

Module Description

CLA20121: The Sustainability Approach | Leitbild Nachhaltigkeit

Version of module description: Gültig ab winterterm 2007/08

Module Level:	Language:	Duration:	Frequency:
Credits:* 2	**Total Hours:**	**Self-study Hours:**	**Contact Hours:**

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 or here.

Module Description

CLA20231: Concepts of Human Being | Mensch und Menschenbilder

Version of module description: Gültig ab winterterm 2007/08

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 45	**Contact Hours:** 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:
Design und Menschenbild (Workshop, 1 SWS)
Belwe A (Anishchenko M, Beltran Bayona J)
For further information in this module, please click campus.tum.de or here.

Module Description

CLA20267: Communication and Presentation | Kommunikation und Präsentation

Version of module description: Gültig ab winterterm 2013/14

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 30	**Contact Hours:** 30

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

Description of Examination Method:
In Präsentationssequenzen (15-20 Min.) zeigen die Studierenden, dass sie in der Lage sind die erarbeiteten Aspekte überzeugender Kommunikation und Präsentation anzuwenden.

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)
Zeus R
For further information in this module, please click campus.tum.de or here.

Module Description

CLA20424: Intercultural Encounters | Interkulturelle Begegnungen

Version of module description: Gültig ab winterterm 2002/03

Module Level: Bachelor/Master	**Language:** German/English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 38	**Contact Hours:** 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 Stereotypiosierung 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:
Come Together! - Inter/Cultural Practice for Locals, Foreigners and World Inhabitants (Workshop, 2 SWS)
Eberhard M, Schliep H
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 45	**Contact Hours:** 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. Am Ende sind die Studierenden in der Lage aus literarische Lektüren 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:
Die Macht der Gefühle. Eine Denk- und Schreibwerkstatt (Seminar, 1,5 SWS)
Ammereller E, Lange K

Selbst geschrieben, neu gelesen - Eine literarische Schreibwerkstatt (Workshop, 1,5 SWS)
Gorelik L
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 37	**Contact Hours:** 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 or here.

Module Description

CLA20705: Diversity and Conflict Management | Diversität und Konfliktmanagement

Version of module description: Gültig ab summerterm 2013

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 38	**Contact Hours:** 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 or here.

Module Description

CLA20710: Global Diversity Training | Global Diversity Training

Version of module description: Gültig ab winterterm 2013/14

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 38	**Contact Hours:** 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)
Eberhard M
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 45	**Contact Hours:** 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 (Ein interaktives Lernprojekt) (Workshop, 1 SWS)
Fänderl W, Quindeau A
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 45	**Contact Hours:** 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 (Ein interaktives Lernprojekt) (Workshop, 1 SWS)
Fänderl W, Quindeau A
For further information in this module, please click campus.tum.de or here.

Module Description

CLA21008: Fundamental Principles of Globalisation | Grundlagen der Globalisierungsforschung

Version of module description: Gültig ab winterterm 2010/11

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 38	**Contact Hours:** 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 or here.

Module Description

CLA21023: Passing Exams in Relaxed Mode | Entspannt Prüfungen bestehen

Version of module description: Gültig ab winterterm 2013/14

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 36	**Contact Hours:** 24

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

Description of Examination Method:
Die Prüfungsleistung besteht aus einem Bericht in Form einer schriftlichen Selbstreflexion (3-4 Seiten), in welchem zu den Themen des Kurses Stellung genommen und die diesbezügliche persönliche Entwicklung nachgezeichnet wird.

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:
Vierthaler, Barbara; Dipl.-Päd. (Univ.)

Courses (Type of course, Weekly hours per semester), Instructor:
Entspannt Prüfungen bestehen (Workshop, 2 SWS)
Hafner B, Kronenberger U (Vierthaler B)
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 38	**Contact Hours:** 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:
Einführung in das wissenschaftliche Arbeiten (Workshop, 1,5 SWS)
Balazs A
For further information in this module, please click campus.tum.de or here.

Module Description

CLA21411: Stress Competence | Stresskompetenz [EDS-M4]

Version of module description: Gültig ab winterterm 2015/16

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 30	**Contact Hours:** 30

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

Description of Examination Method:
Die Prüfungsleistung besteht aus einem Bericht in Form einer schriftlichen Selbstreflexion (3-4 Seiten), in welchem zu den Themen des Kurses Stellung genommen und die diesbezügliche persönliche Entwicklung über vier Wochen nach dem Kurs nachzeichnet wird. 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:
Vierthaler, Barbara; Dipl.-Päd. (Univ.)

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 or here.

Module Description

CLA30257: Big Band | Big Band

Version of module description: Gültig ab winterterm 2013/14

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 or here.

Module Description

CLA30258: Jazz Project | Jazzprojekt

Version of module description: Gültig ab winterterm 2011/12

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 inwiewiet 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. (Gerwichtung: 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 or here.

Module Description

CLA30704: Thinking, Perceiving, and Knowing | Denken, Erkennen und Wissen

Version of module description: Gültig ab summerterm 2012

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 67	**Contact Hours:** 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 or here.

Module Description

CLA31900: Lecture Series Environment - TUM | Vortragsreihe Umwelt - TUM

Version of module description: Gültig ab winterterm 2019/20

Module Level: Bachelor/Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 67	**Contact Hours:** 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:
Cities of Change: Unleashing the Power of Sustainable Solutions (Ringvorlesung Umwelt)
(Vorlesung mit integrierten Übungen, 1,5 SWS)
Nogueira de Carvalho M, Reim L, Slanitz A
For further information in this module, please click campus.tum.de or here.

Module Description

CLA90142: Self-Competence - Intensive Course | Selbstkompetenz - intensiv

Version of module description: Gültig ab winterterm 2013/14

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 1	**Total Hours:** 30	**Self-study Hours:** 12	**Contact Hours:** 18

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

Description of Examination Method:
Die Prüfungsleistung besteht aus einem Bericht in Form einer schriftlichen Selbstreflexion (3-4 Seiten), in welchem zu den Themen des Kurses Stellung genommen und die diesbezügliche persönliche Entwicklung (Veränderung im Lern- und Arbeitsverhalten) nachgezeichnet wird.

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 erfolgreicheres Arbeiten entwickeln, das Leistung und Gesundheit gleichermaßen im Blick behält.

Teaching and Learning Methods:
Gruppenarbeit, Selbstreflexion, Theorie-Inputs

Media:

Reading List:

Responsible for Module:
Vierthaler, Barbara; Dipl.-Päd. (Univ.)

Courses (Type of course, Weekly hours per semester), Instructor:
Stressreduktion durch Achtsamkeit (Entspannung erleben und innere Stärke entwickeln) (Workshop, 1,5 SWS)
Burkhardt S

Erfolgreich durchs Studium. Selbstkompetenzen für den Lernalltag (Online-Kurs) (Workshop, 1,5 SWS)
Hafner B, Kronenberger U, Müller-Hotop R, Reichhart T, Uchronski M, Vierthaler B

Zeit- und Selbstmanagement (Workshop, 1,5 SWS)
Hann S

Schluss mit dem Aufschieben (Workshop, 1,5 SWS)
Kronenberger U (Vierthaler B)

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 (Vierthaler B)

Digital Reset (Besser studieren mit life media balance) (Workshop, 1,5 SWS)
Miller M (Vierthaler B)

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

Lernhacks. Zum eigenen Lernstil finden und smarter studieren (Workshop, 1,5 SWS)
Zeus R
For further information in this module, please click campus.tum.de or here.

Module Description

CLA90211: Art and Politics | Kunst und Politik

Version of module description: Gültig ab summerterm 2017

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 2	**Total Hours:** 60	**Self-study Hours:** 38	**Contact Hours:** 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:
Vor dem Text: Kafka lesen (Seminar, 2 SWS)
Friedrich F, Passola i Lizandra E, Rummeld-Rodenbach M, Valdes Stauber C

Richard Wagner - Werk und Wirkung (Seminar, 1,5 SWS)
Mayer F

MK: Campus – R-Faktor - das Unfassbare. Künstlerische Formen des Protests gegen Rechtsextremismus (Workshop, 1,5 SWS)
Valdes Stauber C
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 30	**Contact Hours:** 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 Darbeitung 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:
Mayer, Felix; Prof. Mag.art.

Courses (Type of course, Weekly hours per semester), Instructor:
Chor am Campus Weihenstephan (Workshop, 2 SWS)
Hör S
For further information in this module, please click campus.tum.de or here.

Elective Courses | Wahlmodule

Fields of Specialization | Vertiefungsbereiche

Environmental Economics and Policy | Environmental Economics and Policy

Module Description

WI000286: Environmental and Natural Resource Economics | Environmental and Natural Resource Economics

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 (90 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:
Environmental and Natural Resource Economics (WI000286, englisch) (Vorlesung mit integrierten Übungen, 4 SWS)
Glebe T

For further information in this module, please click campus.tum.de or here.

Module Description

WZ1590: Climate Change Economics | Climate Change Economics

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 will be based on the competencies acquired from the relevant literature of economic modeling, theories of climate change, and their understanding of 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.

In addition, there is the option of taking a voluntary mid-term assignments as course work in accordance with APSO §6, 5. For this, a presentation (15 min) has to be given.
The module grade can be improved by 0.3 by passing the course work if this better characterises the student's performance level on the basis of the overall impression and the deviation has no influence on passing the examination. No repeat date is offered for the mid-term performance. When retaking a failed module examination at the next possible examination date, successfully passed mid-term assignments will be taken into account.

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 cover the following topics:
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 economic models related to climate change.
• Understand theoretical models of climate change regulations as well as policies that affect emission levels.
• Comprehend the complexity, uncertainty and possibilities associated with optimal emission level.
• Analyze appropriate instruments for emission levels that are efficient and cost-effective.
• Understand different forms of climate agreements and climate action strategies that are currently being implemented

Teaching and Learning Methods:
The course consists of lectures (2 SWS) and seminars (2 SWS). The lecture forms the basis for the subsequent discussion within the seminar 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 (including discussions in the lectures but especially intensive discussions in the seminar) where, 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
EU ETS Handbook. 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) (Seminar, 2 SWS)
Sauer J [L], Canessa C, Frick F

Climate Change Economics (WZ1590, englisch) (Vorlesung, 2 SWS)
Sauer J [L], Canessa C, Frick F
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2936: Sustainable and Environmental Regulations | Sustainable and Environmental Regulations

Version of module description: Gültig ab summerterm 2024

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

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

Description of Examination Method:
Mode of assessment: presentation (around 60 min in total, ca. 30 min per seminar course, contributing in equal weightage to the module grade), complemented by a written executive summary on the topic of the presentation (up to 5 pages per seminar course).
The presentation is a means to measure the students' ability to understand the context an d 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 indicates the capacity of the students to summarize findings and address their implications 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.

Content:
Course 1 "Sustainable Development and Regime Type (SDRT)":
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 (MEA)":
The seminar introduces Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (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 analyzing 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 or here.

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 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 67.5	**Contact Hours:** 82.5

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 forest management and ability to analyze and evaluate related key issues and challenges over different spatial scales. 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 without helping material. Students should be able to develop concepts for the sustainable management of forests using scientific and management methods. The oral exam will last 30 minutes covering all content 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:
Upon successful completion of this module 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 to apply management concepts in supervised groups in the forest and to train computer based methods in the class room.

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, Döllerer M, Fibich J, Pintado K, Schula T
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2716: Forest Growth and Forest Operations | Forest Growth and Forest Operations

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 (Klausur) of 90 minutes. The written examination tests the ability to understand the principles of tree and stand growth of forests, to analyze the influence of the driving forces of forest growth, to describe the structure and possible applications of different types of forest growth models and to assess the effects of climate change on forest growth. In the part “forest operations”, students will be tested on their understanding of mechanized harvesting methods and the most common systems, environmentally sound resource planning, wood transport and timber construction as well as the effects of forest operations on forest stands and soils and current developments in small-scale forest operations.

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:
The learning methods are based on presentations that cover the theoretical principles and methods of forest research, planning, design and management, supported by growth modelling. A fiel d trip is organised to deepen theoretical knowledge.

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; Prof. Dr. agr. habil.

Courses (Type of course, Weekly hours per semester), Instructor:
Low Impact Forest Operations Technology (Exkursion, ,5 SWS)
Findeisen E

Low Impact Forest Operations (Vorlesung, 1,5 SWS)
Findeisen E

Forest Growth (Vorlesung, 2 SWS)
Rötzer T, Torano Caicoya A
For further information in this module, please click 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 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 (Klausur, 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:
Part 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/Werle
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. Werle)
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. Werle)
9. Bark beetles – ecology (S. Werle)
10. Bark beetles – management and impacts (S. Werle)
11. Defoliators (S. Werle)
12. Aphids, adelgids and others (S. Werle)
13. Deadwood-inhabiting insects (S. Werle)
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;
- 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, Werle S
For further information in this module, please click campus.tum.de or here.

Module Description

WZ4082: Plantation Forestry and Agroforestry | Plantation Forestry and Agroforestry

Version of module description: Gültig ab summerterm 2024

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

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

Description of Examination Method:
The assessment for this module is a 90-minute written examination (Klausur) designed to evaluate students' comprehensive understanding and application of key concepts in Plantation Forestry and Agroforestry within the context of international forest and climate policy. The exam will encompass a variety of question types, aimed at testing the students' abilities to critically analyze and address the complexities of plantation and agroforestry management, including the evaluation of impacts, and the application of silvicultural techniques for sustainable plantation and agroforestry systems. Students will be expected to demonstrate their understanding of the role of these land-use systems globally and develop strategic management options that align with international climate goals. Through theoretical scenarios and practical problem-solving questions, the exam will challenge students to integrate their knowledge across topics, from assessing systems to conceptualizing management approaches, ensuring they are equipped with the critical thinking and skills necessary for addressing the challenges in land use systems involving woody components.

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:
Upon successful completion of this module, students are 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 agroforest 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. 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. Agroforesty: 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 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 summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 60

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

Description of Examination Method:
The final examination is a 90-minute written test assessing students' understanding in the field of protected areas biodiversity and its management. This examination evaluates the comprehension of the global perspective on ecosystems and ecosystem services, the ability to explain threats and management strategies in the context of ecosystem utilization and protection and the knowledge and reflection on modern techniques in the management and monitoring of protected areas.

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 word as carriers of natural biodiversity; habitat types 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: Tools for protecting habitats, design of management plans, visitor management, best practice examples and management guidelines in sustainable biodiversity and habitat protection conservation planning and project development, project monitoring and evaluation and problems in protected area management.

Intended Learning Outcomes:
On successful completion of the module students are able:
- to put ecosystems and its utilisation options as well as its threats into a global perspective
- to give clear options for further management, both regarding utilisation and protection
- to use and reflect new techniques for better management and monitoring of protected areas

Teaching and Learning Methods:
This module integrates the lectures "Protected Area Management" and "Biodiversity in Protected Areas". The lecture content is delivered through PowerPoint presentations and group work, blending interactive teaching methods with traditional presentation techniques. Students will apply their theoretical knowledge by working on case studies in groups, where they will evaluate, develop and present management concepts related to protected areas. The students learn to critically analyze and reflect on conservation management strategies and engage in intensive discussions, enhancing their skills in scientific communication at an academic level.

Media:
PowerPoint Presentation

Reading List:
J. Schultz (2005): The Ecozones of the World: Ecological Divisions of the Geosphere. Springer, Berlin. 459p.
M. Lockwood, G. Worboys, A. Kothari (2006). Managing Protected Areas; A Global Guide. Routledge 810p
LN Joppa, JEM Bailie, JG Robinson (2016) Protected Areas: Are They Safeguarding Biodiversity? Wiley 266p

Responsible for Module:
Kühn, Ralph; Apl. Prof. Dr. agr. habil. ralph.kuehn@tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Biodiversity in Protected Areas (Vorlesung, 2 SWS)
Kühn R [L], Gula R, Theuerkauf J

Protected Area Management (Vorlesung, 2 SWS)
Kühn R [L], Gula R, Theuerkauf J
For further information in this module, please click 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 summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 60

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

Description of Examination Method:
The examination consist of a Research Paper (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:
Upon successful completion of the module, students are able to:
- understand important ecological concepts in wildlife management;
- understand the importance of the human dimension in wildlife management;
- analyze 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:
This module integrates the lecture "Wildlife Management" with the seminar "Wildlife-Human Interaction". The lecture utilizes PowerPoint presentations and group work, combining engaging teaching methods with traditional presentation techniques. In the seminar, students apply theoretical knowledge through case studies and group work and presenting conflict resolution concepts in various wildlife-human interaction scenarios. Students will independently review relevant literature and enhancing their skills in scientific communication and conflict resolution at an academic level.

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; 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 or here.

Module Description

WZ6432: Wildlife and Conservation Biology | Wildlife and Conservation Biology

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 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 own research project proposal to practice their scientific communication skills and to transfer the theoretical knowledge to practical projects. Grading from the written exam and the project work are weighed in the ratio 6:4.

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 Sustainability
3. Factors affecting terrestrial and aquatic Biodiversty
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 Biodiverstiy of terrestial 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; Prof. Dr. agr. habil.

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

For further information in this module, please click campus.tum.de or here.

Module Description

WZ4189: Fisheries and Aquatic Conservation | Fisheries and Aquatic Conservation

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 overexpoitation, 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 Ichtyology
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], Geist J, Kalis E, Pander J
For further information in this module, please click campus.tum.de or here.

Landscape Management | Landscape Management

Module Description

WZ2719: Landscape Planning | Landscape Planning

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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; 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 “Landscape Planning – lecture”: 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 “Landscape Planning – seminar”: 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

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 or here.

Module Description

WZ4094: Landscape Management - Application Study | Landscape Management - Application Study

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 75

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

Description of Examination Method:
The attainment of learning outcomes is demonstrated by project work. Students show their ability to work in a team and reach the defined objectives of a project assignment within a given period of time applying suitable methods and concepts of spatial ecology, landscape planning, GIS and remote sensing. Students prepare and deliver a project presentation (45% of module grade) of ca. 10 min per team member and a project report (55% of module grade) of ca. 5 pages per team member demonstrating their capacity to communicate their approach, findings, and conclusions in a concise, scientifically sound and convincing manner, both orally and in writing.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
The successful completion of the modules "Inventory Methods and GIS", "Remote Sensing and Image Processing", "“Spatial Ecology" and "Landscape Planning" or equivalent skills are required, courses on scientific writing and reporting recommended

Content:
- Implementation of GIS and RS techniques.
- Implementation of theoretical concepts of Spatial Ecology;
- Implementation of theoretical concepts of Landscape Planning;
- Oral presentation of findings;
- Elaboration of a final report.

Intended Learning Outcomes:
Upon successful completion of the module, 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 spatial ecology, landscape planning, remote sensing and GIS techniques;
- contribute to context-dependent 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", "Spatial Ecology", "Landscape Planning" is also to be used for the Application Study, among others: Haaren, C. v., Lovett, A. & C. Albert (2019): Landscape Planning with Ecosystem Services – Theories and Methods for Application in Europe. Springer Nature, Dordrecht.

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
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2737: Remote Sensing and Image Processing | Remote Sensing and Image Processing

Version of module description: Gültig ab summerterm 2024

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

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

Description of Examination Method:
The module exam is a project work consisting of exercises, a presentation (10 Min) and a final report (ca. 15 pages). “Hands on” exercises with state of the art software packages are employed to train the main image processing steps and to assess the students’ understanding of the implementation of the basic concepts of remote sensing from data acquisition to data analysis. During the exercises, regular discussions measure the student’s ability to develop an idea from initial concepts to the complete picture within a given time frame, delivering interim results at relevant milestones (35% of the module grade). Each student prepare and deliver a presentation (20% of the module grade) on a topic related to remote sensing, demonstrating their ability to understand a technical/scientific subject, analyze and evaluate facts and influencing factors, summarize and present the issue to an audience, and lead a discussion on the issue presented. In the final report (45% of the module grade), students also demonstrate that they have acquired in-depth knowledge of the specific image analysis software packages and their components, of different analysis concepts, and that they are prepared to evaluate the existing situation as imaged by the respective remote sensing data set. They also demonstrate their ability are able to create new geodata layers suitable for analysis in an integrating GIS environment.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Module " Introduction to GIS and Remote Sensing " of the 1st semester of the Master Program "Sustainable Resource Management" passed, computer skills at least at working level.

Content:
Implementation of data interpretation and information extraction concepts and techniques offered in "hands on" exercises using 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 various parameters from RS image;
10. Change detection concepts;
11.Integration of Remote Sensing and GIS;
12. Accessing and data downloading from geodata providers.

Intended Learning Outcomes:
At the end of the Remote Sensing and Image Processing (RSIP) module, students are able to:
- decide on appropriate datasets for using remote sensing for various spatial problems;
- work with remote sensing image datasets (access databases, download and open, geocode/ georeference, extract various parameters, spectral signatures and calculate indices);
- develop appropriate interpretation keys, visualize and enhance the data set for thematic objective;
- perform unsupervised and supervised classifications;
- prove the quality of the results by an assessing the accuracy, perform a change detection study, and export the results as GIS layer;
- work with image processing software tools;
- deliver an oral presentation to communicate their findings on a selected remote sensing topic in a clear and comprehensible manner to an audience;
- write a persuasive report based on their results according to scientific writing guidelines.

Teaching and Learning Methods:
Through the use of advanced image processing software packages, the concepts explained in theory are practiced in “hands on” exercise and discussed using different data types, applying the “just in time teaching (JiTT)” technique. This is accompanied by presentations by each student on selected remote sensing topics.

Media:
Image processing software and tutorials, prepared exercises, different data types

Reading List:
The literature recommended within the Module " Introduction to GIS and Remote Sensing " should be used.

* Remote Sensing and Image Interpretation by Lillesand, Kiefer, and Chipman (2015). * Remote Sensing Digital Image Analysis - an introduction by Richards, Jia (2005). * Internet tutorials from ESA, DLR, NASA.

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 or here.

Renewable Resources | Renewable Resources

Module Description

WZ2720: Renewable Energy Technologies | Renewable Energy Technologies

Version of module description: Gültig ab winterterm 2015/16

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 proof 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)
Kerscher F [L], Kerschbaum A, Kerscher F, Mörtenkötter H, Schifflechner C, Schweiger B, Westermeier M
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 or here.

Module Description

WZ4098: Forestry Raw Materials and their Utilization | Forestry Raw Materials and their Utilization

Version of module description: Gültig ab winterterm 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 their knowledge on properties assessment and the transformation technologies, in order to select the correct materials and products in societal applications of wood-based materials and develop new wood-based materials and products fit for purpose (solution finding strategies for product development and applications). Additionally, the students have to prepare and give a structured oral presentation (20 min) in a seminar organized at the end of the summer term, with a (voluntary) mid-term assessment, showcasing their ability to analyse products and uses of biobased materials. 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 During the lectures on students are introduced to forestry raw materials and their markets where through integrated exercises they will learn about analysing and developing transition processes from resources to products and applications. They will further self study starting from selected literature on their topics of interest for their oral presentations on the selected topic, exercise, Optional: visit to wood research laboratories.

Media:
Demonstration material: raw materials and products; PP presentations; videos.

Reading List:
Fengel, D.; Wegener, G. (2003): Wood - Chemistry, Ultrastructure, Reactions. Kessel Publishers
Wood Handbook, Forest Products Laboratory (fpl_gtr190-2.pdf)
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-documnts-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:
van de Kuilen, Jan Willem; Prof. Dr.

Courses (Type of course, Weekly hours per semester), Instructor:
Forestry Raw Materials and their Utilization (Vorlesung, 2 SWS)
Sanchez-Ferrer A, Khaloian Sarnaghi A, van de Kuilen J

Forestry Raw Materials and their Utilization (Übung, 2 SWS)
Sanchez-Ferrer A, Khaloian Sarnaghi A, van de Kuilen J

For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 105	**Contact Hours:** 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 or here.

Material and Waste Management | Material and Waste Management

Module Description

WZ4206: Material Flow Management and Applications | Material Flow Management and Applications

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 105	**Contact Hours:** 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 or here.

Module Description

ED160017: Sustainable Manufacturing | Nachhaltige Produktion [SuM]

Version of module description: Gültig ab winterterm 2022/23

Module Level: Master	**Language:** German/English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 105	**Contact Hours:** 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 (Vorlesung, 2 SWS)
Zäh M, Wörle M, Paul M, Pahlevani Qomi K, Sippl F

Sustainable Manufacturing - Exercise (Übung, 1 SWS)
Zäh M, Wörle M, Sippl F
For further information in this module, please click 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 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 120	**Contact Hours:** 30

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 presentation (10 minutes per person) complemented by a written precis (2,5 A4-pages in Arial and font size 10-11 per person), both as a group work with approx. 4 persons per group. The presentation and the written work each make up 50 % of the overall grade. 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. Thereby, students have to demonstrate the understanding of appropriate handling of special waste, the description of status quo of special waste treatment and the relevant legal background based on literature research; they have to show, that they are able to analyse problems of special wastes and to transmit existing solutions; they have to present respective scientific results both in oral (by the presentation itself and by answering questions to the presentation) and written form.

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 “Waste of Electrical and Electronic Equipment (WEEE)” as one typical special waste stream:
- Origin, types and properties of WEEE,
- Collection methods,
- Treatment methods,
- Waste as a source of raw material,
- Energetic utilization,

- Legal specification,
- Design for recycling and waste avoidance.

Intended Learning Outcomes:
Upon successful completion of this module, students are able to:
- understand treatment measures to handle the waste for avoiding or reducing impacts on the environment and human health,
- understand the relevant legal background for sustainable waste handling in European Union,
- analyze problems concerning the special wastes,
- transmit existing solutions to other waste and new products,
- explain and discuss the problems, methods and results of a selected topic by a presentation to and with an auditorium, summarize the most important issues in a short paper.

Teaching and Learning Methods:
The module consists of a lecture part, providing the theoretical foundations of the course content. The main part is a seminar, in which the students elaborate and present a special topic and the lecturer gives feedback to the students' work. The students have to analyse problems regarding a special waste collaboratively in group work by 2-4 students studying specialist literature. At the end, they have to prepare a presentation and a written summary including problem statement and conclusions as homework. The students are supervised by the lecturer.

Media:
PowerPoint Presentation

Reading List:
Goodship, V., Stevels, A., Huisman, J. (Eds.), 2019: Waste Electrical and Electronic Equipment (WEEE) Handbook.
A volume in Woodhead Publishing Series in Electronic and Optical Materials. Elsevier, Second Edition, https://doi.org/10.1016/C2016-0-03853-6
Hester, R.E., Harrison, R.M. (Eds.), 2009: Electronic waste management: design, analysis and application, Cambridge, RSC Publishing, 280 pp., ISBN 978-0-85404-112-1
Other literature, presented in introductory lecture.

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 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 105	**Contact Hours:** 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. In the case of group examination, students' performance will be evaluated individually. 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 Neser – Bavarian State Research Center for Agriculture; Institute for Agricultural Engeneering and Animal Husbandry; Voettinger Strasse 36, 85354 Freising, 0049 8161 713566; stefan.neser@lfl.bayern.de

Courses (Type of course, Weekly hours per semester), Instructor:
Emission control in Land-Use and Animal Husbandry (Vorlesung, 3 SWS)
Neser S
For further information in this module, please click campus.tum.de or here.

Agricultural Land-Use Systems | Agricultural Land-Use Systems

Module Description

WZ2725: Land-Use Systems from Local and Global Perspectives | Land-Use Systems from Local and Global Perspectives

Version of module description: Gültig ab winterterm 2015/16

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 exam (duration: 30 minutes).
In this form of exam the students can show how they are able to explain the farming systems and describe the elements and farming methods. Due to a deeper discussion the examiner is able to evaluate the students under-standing of farm practices, system concepts and interactions with site conditions.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
None

Content:
Basic information on farming: crops, crop rotations, permanent crops: hops and orchards; soil management, weed management; implements and machinery; organic and mineral fertilizers; pesticide use; livestock: animal husbandry, breeding criteria; consumer expectations; exemplified by Bavarian and German cases.
Introduction to farming systems worldwide: pastoral systems, permanent crops plantation systems, mixed systems, arable systems, intensive animal keeping; horticultural systems; students experience with agricultural land use in their countries.

Intended Learning Outcomes:
On successful completion of the module students are able to remember and identify different crops, farm animals, machines and implements. They will be able to describe farming systems

esp. the difference of organic and conventional systems. They will understand farm management methods and interactions inside farming systems. The students can classify land-use systems worldwide and are able to explain the main elements and to evaluate the sustainability and resource impact.

Teaching and Learning Methods:
Lectures providing theoretical foundations. Examples will be given during the lectures.
Short field trips to farms and university research station, demonstrating crops, animals, technical equipment.
Short discussion sessions.

Media:
Power Point.

Reading List:
Tba

Responsible for Module:
Dr. Hans-Jürgen Reents; Dipl. Ing. Max Kainz - Lehrstuhl für Ökologischen Landbau und Pflanzenbausysteme Liesel Beckmann Str. 2, 85354 Freising, 08161/71 - 3778, reents@wzw.tum.de, kainz@wzw.tum.de

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

For further information in this module, please click campus.tum.de or here.

Module Description

WZ2726: Assessment of Sustainability in Agriculture - Theory and Case Studies | Assessment of Sustainability in Agriculture - Theory and Case Studies

Version of module description: Gültig ab winterterm 2015/16

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 60

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

Description of Examination Method:
The Assignment (Report+Assessment) is done as groupwork (2-3 students). As the report and assessment is based on a farm visit and to register presented details and understand the complexity of the system group working is necessary. The assignment shows the ability of the students to describe the farming system, to apply the developed criteria of sustainable agricultural practice, to assess the sustainability of farm as a system and to give recommendations for an improved development.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
None

Content:
Sustainability in farms context, principles of sustainability, criteria, inquiry strategies, indicator and indicator concepts, assessment and benchmarking.
Application to farming systems and farms at different level of intensification; case studies based on excursions: arable farming, organic vs. conventional farming, vegetable production in arable farms, grassland based farming system, dairy farming, suckling beef production.

Intended Learning Outcomes:
On successful completion of the module students are able to understand the idea of sustainability in the context of farms. They will have the ability to create criteria and indicators to assess sustainability of farms and to built up benchmarking systems. The students can describe farming

systems and are able to evaluate the sustainability using criteria and indicators and to document them in a report.

Teaching and Learning Methods:
Lectures with presentation of principles and systematics
Reading papers
Group work, mind mapping, meta plan technical to document discussion results.

Media:
Power Point, Flip Chart, Pin wall, Metaplan technic

Reading List:
Tba

Responsible for Module:
Dipl. Ing. Max Kainz; Dr. Hans-Jürgen Reents - Lehrstuhl für Ökologischen Landbau und Pflanzenbausysteme, Liesel Beckmann Str. 2, 85354 Freising, 08161/71 - 3778, kainz@wzw.tum.de, reents@wzw.tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Assessment of Sustainability in Agriculture- Theory and Case Studies
Hans-Jürgen Reents, Max Kainz
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2727: Sustainability of Food Chains | Sustainability of Food Chains

Version of module description: Gültig ab winterterm 2015/16

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

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

Description of Examination Method:
Combination of Poster and oral presentation provides to assess the students ability to conduct a life cycle analysis of a special food product. The poster needs a very concentrated presentation, focus on the important information and factors and shows the students capability to understand the principles of the LCA and the special food production process.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Attendance in Module 4209 and 4210 is recommended.

Content:
Food chains of processed food, from agricultural production via processing to packed product unit in a food store, principles of life cycle analysis, assessment criteria, energy input output ratio, energy efficiency, CO2 emission, carbon footprint, virtual water
LCA calculation and calculation program (Umberto).

Intended Learning Outcomes:
At the end of the module the students are able to understand food chains. They can describe and apply life cycle analysis to processed food products. They are able to assess energy and emission impact of different crop and animal production system and processing procedures. The will get basic skills of the software Umberto.

Teaching and Learning Methods:
Teachers Presentations Life cycle analysis, food chain, energy, CO2 emission and water impacts, students contributions, special aspects of processing paper reading for contributions to group discussions and outline of the final presentation.

Media:
Presentation notes, computer program.

Reading List:
Tba

Responsible for Module:
Dipl. Ing. Max Kainz - Lehrstuhl für Ökologischen Landbau und Pflanzenbausysteme Liesel Beckmann Str. 2, 85354 Freising, 08161/71 - 3034, kainz@wzw.tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Sustainabilityof Food Chains
Max Kainz
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2728: Sustainable Land-Use Management | Sustainable Land-Use Management

Version of module description: Gültig ab winterterm 2015/16

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

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

Description of Examination Method:
In a Power Point (or comparable tool) supported oral presentation the students can show, how they identify a special issue of farm management related to terms of sustainability. In the further outline of the presentation, the students will show how to discuss the topic based on recorded results from published papers, to explain conclusions and to suggestsolutions on improved sustainability.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
None

Content:
Agricultural systems and their relation to natural and human resources; site, economic and social conditions, regional and global,
adaptation of farm management techniques to principles of sustainability, research and scientific results, terms of politics and social debate, aims and scenarios for future development
Topics selected participative with the students.

Intended Learning Outcomes:
On successful completion of the module students are able to identify special problems of sustainability in farm management, economic and social conditions, to analyze the technical, social and economic impacts and to evaluate them on the background of criteria of sustainability. They will be able to create solutions for critical impacts.

Teaching and Learning Methods:
Lectures provide facts, background and theoretical foundations.

Papers have to be read and used in group work.
Group work.

Media:
Power Point Presentations
Flip Chart
Pin wall, Metaplan technique

Reading List:
Tba

Responsible for Module:
Dipl. Ing. Max Kainz; Dr. Hans-Jürgen Reents - Lehrstuhl für Ökologischen Landbau und Pflanzenbausysteme, Liesel Beckmann Str. 2, 85354 Freising, 08161/71 - 3778, kainz@wzw.tum.de, reents@wzw.tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Case Studies of Land-Use Management
Hans-Jürgen Reents, Max Kainz
For further information in this module, please click 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 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 their 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 on 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-, runoff-, 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., rainwater 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 “Introduction into Hydrometeorology” with thorough explanations. Within the lecture, additionally some simple case studies are used to introduce the theoretical background (e.g. meteorological instruments at the meteorological platform). Student presentations and discussions as well as group work are the main content of the adjacent course “Management of Water Resources”.

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 or here.

Module Description

WZ2722: Mountain Catchments under Changing Climate | Mountain Catchments under Changing Climate

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 75

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

Description of Examination Method:
In a written exam (Klausur, 60 min), 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 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:
WZ2731Hydrometeorology 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 SWAT+
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 quasi-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. SWAT+), 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)
Alcamo L, Broich K

Field Course in Applied Hydrometeorology (Vorlesung mit integrierten Übungen, 3 SWS)
Menzel A [L], Lüpke M, Menzel A
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 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 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 summerterm 2024

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

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

Description of Examination Method:
Assessment consisting of oral examination on the lecture and the seminar (30 min). In the oral examination, students are expected to demonstrate that they have understood the physical basis of the climate system and that they can identify the drivers of climate change. The students show that they are able to apply their knowledge to develop adaptation and mitigation measures and to argue in discussions on climate change issues.
In addition, there is the option of taking a voluntary mid-term assignments as coursework in accordance with APSO §6, 5. For this, a presentation (20 min + 10 min discussion) has to be given. In the presentation, the students summarize findings from scientific publications or case studies and present the content to an audience. Additionally, the students are expected to demonstrate that they are able to respond competently to any questions, suggestions or discussions brought by the audience and relating to their subject area. The module grade can be improved by 0.3 by passing the coursework if this better characterizes the student's performance level on the basis of the overall impression and the deviation has no influence on passing the examination. No repeat date is offered for the mid-term performance. When retaking a failed module examination at the next possible examination date, successfully passed mid-term assignments will be taken into account.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Basic knowledge in meteorology, physics, biology.

Content:
Based on findings from the latest IPCC report (AR6) 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 on climate change mitigation and adaptation will be intensified in case studies.

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 drivers 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.

Media:
Lecture with PowerPoint Presentation, reader and exercises. Group work in seminar including problem driven case studies and student presentations, excursion.

Reading List:
IPCC, 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 35-115

Selected chapters from the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC-AR6) 2021, 2022, 2023 and 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], Rammig A
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2733: Introduction to Soil Science | Introduction to Soil Science

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 67.5	**Contact Hours:** 82.5

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 prove by answering questions without helping material their understanding of soil-forming processes and important mineralogical, biochemical and physical properties of soils. Furthermore, 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 a soil profile. They are required to use the surveyed characteristics to discuss genesis and possibilities of the soil and the risks to the soil and its environment.

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-forming processes and important mineralogical, biochemical and physical properties. The students are able to survey the major characteristics of 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, using the Field Guide of the international soil classification system WRB. 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, erosion assessment kits.

Reading List:
1. Weil R, Brady N (2016): The nature and properties of soils. 15th edition.
2. Scheffer/Schachtschabel (2016): Soil Science. Springer, Heidelberg.
3. Eash, Sauer, O'Dell, Odoi, Bratz (2016): Soil science simplified. 6th edition.
4. Blum WEH, Schad P, Nortcliff S (2016): Essentials of Soil Science.
5. IUSS Working Group WRB (2022): World Reference Base for Soil Resources. 4th edition. International Union of Soil Sciences (IUSS), Vienna, Austria.

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, Just C
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2734: Soil Protection | Soil Protection

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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. They prove their understanding of the major environmental factors determining food production and are required to design adequate land-use methods. They prove their understanding of the major factors determining the fate of pollutants in soil and are required to design scenarios to manage and remediate brownfields.

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 kaolinitc 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:
The lecture presents and discusses the state of soil degradation and how to avoid and to meliorate it.

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 or here.

Module Description

WZ2735: World Soil Resources | World Soil Resources

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 78	**Contact Hours:** 72

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 according to the international soil classification system World Reference Base for Soil Resources (WRB)
• Chemical, biological and physical properties of soils
• Genesis of soils as the result of soil-forming factors
• Soil survey using the WRB Field Guide
• Soil classification according to the international system WRB
• 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:
1. Zech W, Schad P, Hintermaier-Erhard G (2022): Soils of the World. Springer, Heidelberg.
2. IUSS Working Group WRB (2022): World Reference Base for Soil Resources. 4th edition. International Union of Soil Sciences (IUSS), Vienna, Austria.

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, Just C
For further information in this module, please click 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 2024

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

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

Description of Examination Method:
The students are required to demonstrate that they are able to apply their knowledge of the major physical, chemical, and biological processes in soils to their laboratory assessments. This will be tested by 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. In the research paper, the students are required to show their competences to interpret the laboratory data and how to draw and communicate scientific conclusions. To assess the scientific communication skills of the students, the research paper is accompanied by an oral presentation (15-20 min) in which the students demonstrate that they are able to communicate their findings also in an oral manner. 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:
• Guidelines of scientific working, sampling and sample preparation
• Lab analyses: Soil texture, bulk density, water retention and conductivity, organic and inorganic carbon, nitrogen, microbial biomass, pH, cation exchange capacity, pedogenic oxides, phosphate retention

Intended Learning Outcomes:
The students are able to apply their knowledge of soils, as achieved in the module “Introduction to Soil Science”, to assess the most important physical, chemical and biological processes in soils. They are able to determine the suitability of laboratory methods to answer research questions related to soil. The students know how to conduct a target-oriented sampling, adequately prepare samples 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 findings in a written and an oral manner.

Teaching and Learning Methods:
The theoretical background of various soil analysis methods is provided. Afterwards, the methods are implemented by the students themselves, guided by the lecturers and the laboratory staff ranging from sampling, to analyses, and to data interpretation.

Media:
Lecture: presentation notes; sampling: field equipment; laboratory course: laboratory instruments

Reading List:
Pansu and Gautheyrou, 1st Edition (2006): Handbook of Soil Analysis Mineralogical, Organic and Inorganic Methods, Springer, Berlin (Germany).
Carter and Gregorich, 2nd Edition (2007): Soil Sampling and Methods of Analysis, CRC Press, Boca Raton (USA).
Blume, Stahr and Leinweber, 3rd Edition (2010): Bodenkundliches Praktikum Eine Einführung in pedologisches Arbeiten für Ökologen, Land- und Forstwirte, Geo- und Umweltwissenschaftler, Spektrum Akademischer Verlag Heidelberg
Amelung et al., 1st edition (2016): Scheffer/Schachtschabel Soil Science Springer, Berlin (Germany).

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)
Prietzel J [L], Prietzel J, Schweizer S, Bucka F, Göttlein A, Kolb E, Laniewski R, Leemhuis S

Analytical characterization of soil resources: Lecture (Vorlesung, 1 SWS)
Schweizer S
For further information in this module, please click campus.tum.de or here.

Elective Modules | Elective Modules

Module Description

BGU38019: Anaerobic Processes and Energy Recovery | Anaerobtechnik und Energierückgewinnung

Version of module description: Gültig ab winterterm 2018/19

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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., Degrève, 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 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 winterterm 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 7	**Total Hours:** 210	**Self-study Hours:** 150	**Contact Hours:** 60

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

Description of Examination Method:
Term paper: 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.

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 preceeding semester.

Intended Learning Outcomes:
The seminar aims at enabling students for scientific work. After passing the module the sutdents 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-depht 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 sicentific 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:
Fröhling, Magnus; Prof. Dr. rer. pol.

Courses (Type of course, Weekly hours per semester), Instructor:
Advanced Seminar Circular Economy and Sustainability Management: CE in Global South (Seminar, 4 SWS)
Fröhling M [L], Heinrich V, Fröhling M
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 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 pasing 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). 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 (Übung, 3 SWS)
Egerer M [L], Egerer M, Pauleit S, Rahman M

Advanced Concepts and Methods in Urban Ecosystems (Seminar, 2 SWS)
Egerer M [L], Egerer M, Pauleit S, Rahman M

For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 or here.

Module Description

WZ2726: Assessment of Sustainability in Agriculture - Theory and Case Studies | Assessment of Sustainability in Agriculture - Theory and Case Studies

Version of module description: Gültig ab winterterm 2015/16

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 60

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

Description of Examination Method:
The Assignment (Report+Assessment) is done as groupwork (2-3 students). As the report and assessment is based on a farm visit and to register presented details and understand the complexity of the system group working is necessary. The assignment shows the ability of the students to describe the farming system, to apply the developed criteria of sustainable agricultural practice, to assess the sustainability of farm as a system and to give recommendations for an improved development.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
None

Content:
Sustainability in farms context, principles of sustainability, criteria, inquiry strategies, indicator and indicator concepts, assessment and benchmarking.
Application to farming systems and farms at different level of intensification; case studies based on excursions: arable farming, organic vs. conventional farming, vegetable production in arable farms, grassland based farming system, dairy farming, suckling beef production.

Intended Learning Outcomes:
On successful completion of the module students are able to understand the idea of sustainability in the context of farms. They will have the ability to create criteria and indicators to assess sustainability of farms and to built up benchmarking systems. The students can describe farming

systems and are able to evaluate the sustainability using criteria and indicators and to document them in a report.

Teaching and Learning Methods:
Lectures with presentation of principles and systematics
Reading papers
Group work, mind mapping, meta plan technical to document discussion results.

Media:
Power Point, Flip Chart, Pin wall, Metaplan technic

Reading List:
Tba

Responsible for Module:
Dipl. Ing. Max Kainz; Dr. Hans-Jürgen Reents - Lehrstuhl für Ökologischen Landbau und Pflanzenbausysteme, Liesel Beckmann Str. 2, 85354 Freising, 08161/71 - 3778, kainz@wzw.tum.de, reents@wzw.tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Assessment of Sustainability in Agriculture- Theory and Case Studies
Hans-Jürgen Reents, Max Kainz
For further information in this module, please click 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 2024

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

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

Description of Examination Method:
The students are required to demonstrate that they are able to apply their knowledge of the major physical, chemical, and biological processes in soils to their laboratory assessments. This will be tested by 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. In the research paper, the students are required to show their competences to interpret the laboratory data and how to draw and communicate scientific conclusions. To assess the scientific communication skills of the students, the research paper is accompanied by an oral presentation (15-20 min) in which the students demonstrate that they are able to communicate their findings also in an oral manner. 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:
• Guidelines of scientific working, sampling and sample preparation
• Lab analyses: Soil texture, bulk density, water retention and conductivity, organic and inorganic carbon, nitrogen, microbial biomass, pH, cation exchange capacity, pedogenic oxides, phosphate retention

Intended Learning Outcomes:
The students are able to apply their knowledge of soils, as achieved in the module “Introduction to Soil Science”, to assess the most important physical, chemical and biological processes in soils. They are able to determine the suitability of laboratory methods to answer research questions related to soil. The students know how to conduct a target-oriented sampling, adequately prepare samples 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 findings in a written and an oral manner.

Teaching and Learning Methods:
The theoretical background of various soil analysis methods is provided. Afterwards, the methods are implemented by the students themselves, guided by the lecturers and the laboratory staff ranging from sampling, to analyses, and to data interpretation.

Media:
Lecture: presentation notes; sampling: field equipment; laboratory course: laboratory instruments

Reading List:
Pansu and Gautheyrou, 1st Edition (2006): Handbook of Soil Analysis Mineralogical, Organic and Inorganic Methods, Springer, Berlin (Germany).
Carter and Gregorich, 2nd Edition (2007): Soil Sampling and Methods of Analysis, CRC Press, Boca Raton (USA).
Blume, Stahr and Leinweber, 3rd Edition (2010): Bodenkundliches Praktikum Eine Einführung in pedologisches Arbeiten für Ökologen, Land- und Forstwirte, Geo- und Umweltwissenschaftler, Spektrum Akademischer Verlag Heidelberg
Amelung et al., 1st edition (2016): Scheffer/Schachtschabel Soil Science Springer, Berlin (Germany).

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)
Prietzel J [L], Prietzel J, Schweizer S, Bucka F, Göttlein A, Kolb E, Laniewski R, Leemhuis S

Analytical characterization of soil resources: Lecture (Vorlesung, 1 SWS)
Schweizer S
For further information in this module, please click 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 winterterm 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 180	**Self-study Hours:** 90	**Contact Hours:** 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 (Klausur, 90 min). In the written examination, students demonstrate by answering questions under time pressure and only with the help of a calculator the theoretical and practical knowledge of resource problems. By answering to open questions, students can proof their ability to describe apply economic theory, for example, by demonstrating their understanding of the problem of optimal time paths of resource use, or by explaining welfare effects of production systems.
In addition, there is the possibility to perform a voluntary study performance as a mid-term performance according to APSO §6 (5). For this, a presentation (20 min) has to be passed.
By passing the course work, the module grade is improved by 0.3, if, based on the overall impression, this better characterizes the student's performance level, and the deviation has no influence on the passing of the examination. No repeat date is offered for the mid-term performance. In the case of repeating the module examination, a mid-term performance already achieved will be considered.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Basic knowledge of environmental and natural resource economics is 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.
By the delivery of a presentation, students demonstrate the ability to understand an economic/ scientific subject out of its theoretical abstraction, to analyse and evaluate relevant policy measures and factors of influence, to summarize the subject and present it to an audience, and to stand a discussion about the presented subject. By the written summary, they improve their ability to summarise the major facts and the conclusion of a presentation in a clear and concise manner. Also, they learn how to integrate different views on questions of resource use and how to critically reflect on them.

Teaching and Learning Methods:
Lectures will be used to teach the theoretical material. The other part of the module will consist of a seminar. There, students under the supervision of the instructors will 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 studies). Students are encouraged to actively participate in the course programme by giving a presentation (20 min), which shall also be prepared in written form (around 10 pages). The presentation shall analyse a lecture topic in detail and place it in the economic environment. It shall be designed in a way that allows the demonstration of theoretical economic concepts in real life examples (e.g., environmental agreements in game theory, methods of environmental evaluation). By preparing a presentation on their own and developing a short paper of it, students will enhance and deepen the knowledge gained in the lecture and learn how economic theory is applied in real life situations.

Media:
Lecture notes, PowerPoint presentations, Excel

Reading List:
Perman, R., Y. Ma, M. S. Common, D. Maddison, and J. McGilvray. 2011. "Natural Resource and Environmental Economics.". Fourth edition London: Pearson Education.

Responsible for Module:
Sauer, Johannes; Prof. Dr. agr.

Courses (Type of course, Weekly hours per semester), Instructor:
Advanced Environmental and Natural Resource Economics (WZ2757, englisch) (Vorlesung, 4 SWS)

Sauer J [L], Canessa C, Henao Henao J, Villalba Camacho R
For further information in this module, please click campus.tum.de or here.

Module Description

WZ1590: Climate Change Economics | Climate Change Economics

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 will be based on the competencies acquired from the relevant literature of economic modeling, theories of climate change, and their understanding of 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.

In addition, there is the option of taking a voluntary mid-term assignments as course work in accordance with APSO §6, 5. For this, a presentation (15 min) has to be given.
The module grade can be improved by 0.3 by passing the course work if this better characterises the student's performance level on the basis of the overall impression and the deviation has no influence on passing the examination. No repeat date is offered for the mid-term performance. When retaking a failed module examination at the next possible examination date, successfully passed mid-term assignments will be taken into account.

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 cover the following topics:
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 economic models related to climate change.
• Understand theoretical models of climate change regulations as well as policies that affect emission levels.
• Comprehend the complexity, uncertainty and possibilities associated with optimal emission level.
• Analyze appropriate instruments for emission levels that are efficient and cost-effective.
• Understand different forms of climate agreements and climate action strategies that are currently being implemented

Teaching and Learning Methods:
The course consists of lectures (2 SWS) and seminars (2 SWS). The lecture forms the basis for the subsequent discussion within the seminar 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 (including discussions in the lectures but especially intensive discussions in the seminar) where, 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
EU ETS Handbook. 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) (Seminar, 2 SWS)
Sauer J [L], Canessa C, Frick F

Climate Change Economics (WZ1590, englisch) (Vorlesung, 2 SWS)
Sauer J [L], Canessa C, Frick F
For further information in this module, please click 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 summerterm 2024

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

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

Description of Examination Method:
Assessment consisting of oral examination on the lecture and the seminar (30 min). In the oral examination, students are expected to demonstrate that they have understood the physical basis of the climate system and that they can identify the drivers of climate change. The students show that they are able to apply their knowledge to develop adaptation and mitigation measures and to argue in discussions on climate change issues.
In addition, there is the option of taking a voluntary mid-term assignments as coursework in accordance with APSO §6, 5. For this, a presentation (20 min + 10 min discussion) has to be given. In the presentation, the students summarize findings from scientific publications or case studies and present the content to an audience. Additionally, the students are expected to demonstrate that they are able to respond competently to any questions, suggestions or discussions brought by the audience and relating to their subject area. The module grade can be improved by 0.3 by passing the coursework if this better characterizes the student's performance level on the basis of the overall impression and the deviation has no influence on passing the examination. No repeat date is offered for the mid-term performance. When retaking a failed module examination at the next possible examination date, successfully passed mid-term assignments will be taken into account.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Basic knowledge in meteorology, physics, biology.

Content:
Based on findings from the latest IPCC report (AR6) 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 on climate change mitigation and adaptation will be intensified in case studies.

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 drivers 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.

Media:
Lecture with PowerPoint Presentation, reader and exercises. Group work in seminar including problem driven case studies and student presentations, excursion.

Reading List:
IPCC, 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 35-115

Selected chapters from the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC-AR6) 2021, 2022, 2023 and 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], Rammig A
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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:
Whiteboard, PowerPoint, Lab work

Reading List:
1) Hillel, D. (1998). Environmental soil physics. San Diego (Calif.): Academic Press.
2) Soil Hydrology and Biophysics by John Selker & Dani Or (Open access book)
3) Weekly distributed lecture notes

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 (Übung, 4 SWS)
Zare M [L], Hafner B, Moser D, Zare M
For further information in this module, please click campus.tum.de or here.

Module Description

POL62200: Energy Transformation | Energy Transformation

Version of module description: Gültig ab winterterm 2017/18

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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 scienitific 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)

Ohlhorst D

For further information in this module, please click 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 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 (90 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:
Environmental and Natural Resource Economics (WI000286, englisch) (Vorlesung mit integrierten Übungen, 4 SWS)
Glebe T
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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.
In addition, there is the option of taking a voluntary mid-term assignment as coursework in accordance with APSO §6, 5. For this, 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 has to be given. 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 module grade can be improved by 0.3 by passing the course work if this better characterizes the student's performance level on the basis of the overall impression and the deviation has no influence on passing the examination. No repeat date is offered for the mid-term performance. When retaking a failed module examination at the next possible examination date, successfully passed mid-term assignments will be taken into account.

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 recourses 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 mit integrierten Übungen, 4 SWS)
Sauer J [L], Vrachioli M
For further information in this module, please click 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 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 a Report (project report), 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 report is supplemented by a presentation. 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). The individual contribution to the group performance must be clearly visible (i.e., Author Contributions).

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. The 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 successful completion of the module, students are 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
- Hu Y, Schmidhalter U (2023) Opportunity and challenges of phenotyping plant salt tolerance. Trends in Plant Science 28(5): 552-566. DOI: doi.org/10.1016/j.tplants.2022.12.010
- Hund A., Kronenberg L., Anderegg J., Yu K. & Walter A. (2019). Non-invasive field phenotyping of cereal development. In Frank Ordon & Wolfgang Friedt (Eds.), Advances in breeding techniques for cereal crops (pp. 249–292). Burleigh Dodds Science Publishing. https://doi.org/10.19103/AS.2019.0051.13
- Zhang J., Hu Y., Li F., Fue K.G. & Yu K. (2024). Meta-Analysis Assessing Potential of Drone Remote Sensing in Estimating Plant Traits Related to Nitrogen Use Efficiency. Remote Sensing, 16(5), Article 5. https://doi.org/10.3390/rs16050838

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)
Yu K [L], Yu K, Hu Y, Afrasiabian Y
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 metodoligical 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 quantiative 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

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

For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 105	**Contact Hours:** 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. In the case of group examination, students' performance will be evaluated individually. 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 Neser – Bavarian State Research Center for Agriculture; Institute for Agricultural Engeneering and Animal Husbandry; Voettinger Strasse 36, 85354 Freising, 0049 8161 713566; stefan.neser@lfl.bayern.de

Courses (Type of course, Weekly hours per semester), Instructor:
Emission control in Land-Use and Animal Husbandry (Vorlesung, 3 SWS)
Neser S
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 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 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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%).

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], Chen H, Denk A, Lang W, Schade C, Schwering K, Woytowicz J

Fallstudien nachhaltiger Quartiers-, Stadt- und Infrastrukturentwicklungen (Seminar, 2 SWS)
Lang W [L], Chen H, Denk A, Schade C, Schwering K, Woytowicz J
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2716: Forest Growth and Forest Operations | Forest Growth and Forest Operations

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 (Klausur) of 90 minutes. The written examination tests the ability to understand the principles of tree and stand growth of forests, to analyze the influence of the driving forces of forest growth, to describe the structure and possible applications of different types of forest growth models and to assess the effects of climate change on forest growth. In the part “forest operations”, students will be tested on their understanding of mechanized harvesting methods and the most common systems, environmentally sound resource planning, wood transport and timber construction as well as the effects of forest operations on forest stands and soils and current developments in small-scale forest operations.

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:
The learning methods are based on presentations that cover the theoretical principles and methods of forest research, planning, design and management, supported by growth modelling. A fiel d trip is organised to deepen theoretical knowledge.

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; Prof. Dr. agr. habil.

Courses (Type of course, Weekly hours per semester), Instructor:
Low Impact Forest Operations Technology (Exkursion, ,5 SWS)
Findeisen E

Low Impact Forest Operations (Vorlesung, 1,5 SWS)
Findeisen E

Forest Growth (Vorlesung, 2 SWS)
Rötzer T, Torano Caicoya A
For further information in this module, please click 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 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 their knowledge on properties assessment and the transformation technologies, in order to select the correct materials and products in societal applications of wood-based materials and develop new wood-based materials and products fit for purpose (solution finding strategies for product development and applications). Additionally, the students have to prepare and give a structured oral presentation (20 min) in a seminar organized at the end of the summer term, with a (voluntary) mid-term assessment, showcasing their ability to analyse products and uses of biobased materials. 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 During the lectures on students are introduced to forestry raw materials and their markets where through integrated exercises they will learn about analysing and developing transition processes from resources to products and applications. They will further self study starting from selected literature on their topics of interest for their oral presentations on the selected topic, exercise, Optional: visit to wood research laboratories.

Media:
Demonstration material: raw materials and products; PP presentations; videos.

Reading List:
Fengel, D.; Wegener, G. (2003): Wood - Chemistry, Ultrastructure, Reactions. Kessel Publishers
Wood Handbook, Forest Products Laboratory (fpl_gtr190-2.pdf)
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-documnts-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:
van de Kuilen, Jan Willem; Prof. Dr.

Courses (Type of course, Weekly hours per semester), Instructor:
Forestry Raw Materials and their Utilization (Übung, 2 SWS)
Sanchez-Ferrer A, Khaloian Sarnaghi A, van de Kuilen J

Forestry Raw Materials and their Utilization (Vorlesung, 2 SWS)
Sanchez-Ferrer A, Khaloian Sarnaghi A, van de Kuilen J

For further information in this module, please click campus.tum.de or here.

Module Description

WZ4161: Forest Management | Forest Management

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 67.5	**Contact Hours:** 82.5

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 forest management and ability to analyze and evaluate related key issues and challenges over different spatial scales. 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 without helping material. Students should be able to develop concepts for the sustainable management of forests using scientific and management methods. The oral exam will last 30 minutes covering all content 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:
Upon successful completion of this module 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 to apply management concepts in supervised groups in the forest and to train computer based methods in the class room.

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, Döllerer M, Fibich J, Pintado K, Schula T
For further information in this module, please click campus.tum.de or here.

Module Description

WZ4189: Fisheries and Aquatic Conservation | Fisheries and Aquatic Conservation

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 overexpoitation, 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 Ichtyology
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], Geist J, Kalis E, Pander J
For further information in this module, please click 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

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

For further information in this module, please click 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 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 (Klausur, 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:
Part 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/Werle
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. Werle)
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. Werle)
9. Bark beetles – ecology (S. Werle)
10. Bark beetles – management and impacts (S. Werle)
11. Defoliators (S. Werle)
12. Aphids, adelgids and others (S. Werle)
13. Deadwood-inhabiting insects (S. Werle)
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;
- 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, Werle S
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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, englisch) (Seminar, 4 SWS)
Bitsch V [L], Bitsch V
For further information in this module, please click 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 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 their 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 on 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-, runoff-, 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., rainwater 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 “Introduction into Hydrometeorology” with thorough explanations. Within the lecture, additionally some simple case studies are used to introduce the theoretical background (e.g. meteorological instruments at the meteorological platform). Student presentations and discussions as well as group work are the main content of the adjacent course “Management of Water Resources”.

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 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 135	**Contact Hours:** 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 develope 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 (identic 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 assistent, 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, Erhart M, Rane D
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 90	**Contact Hours:** 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 Bulleting (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 Pegram (2020) Global Climate Governance, Cambridge: Cambidge 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 or here.

Module Description

WZ2733: Introduction to Soil Science | Introduction to Soil Science

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 67.5	**Contact Hours:** 82.5

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 prove by answering questions without helping material their understanding of soil-forming processes and important mineralogical, biochemical and physical properties of soils. Furthermore, 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 a soil profile. They are required to use the surveyed characteristics to discuss genesis and possibilities of the soil and the risks to the soil and its environment.

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-forming processes and important mineralogical, biochemical and physical properties. The students are able to survey the major characteristics of 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, using the Field Guide of the international soil classification system WRB. 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, erosion assessment kits.

Reading List:
1. Weil R, Brady N (2016): The nature and properties of soils. 15th edition.
2. Scheffer/Schachtschabel (2016): Soil Science. Springer, Heidelberg.
3. Eash, Sauer, O'Dell, Odoi, Bratz (2016): Soil science simplified. 6th edition.
4. Blum WEH, Schad P, Nortcliff S (2016): Essentials of Soil Science.
5. IUSS Working Group WRB (2022): World Reference Base for Soil Resources. 4th edition. International Union of Soil Sciences (IUSS), Vienna, Austria.

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, Just C
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2725: Land-Use Systems from Local and Global Perspectives | Land-Use Systems from Local and Global Perspectives

Version of module description: Gültig ab winterterm 2015/16

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 exam (duration: 30 minutes).
In this form of exam the students can show how they are able to explain the farming systems and describe the elements and farming methods. Due to a deeper discussion the examiner is able to evaluate the students under-standing of farm practices, system concepts and interactions with site conditions.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
None

Content:
Basic information on farming: crops, crop rotations, permanent crops: hops and orchards; soil management, weed management; implements and machinery; organic and mineral fertilizers; pesticide use; livestock: animal husbandry, breeding criteria; consumer expectations; exemplified by Bavarian and German cases.
Introduction to farming systems worldwide: pastoral systems, permanent crops plantation systems, mixed systems, arable systems, intensive animal keeping; horticultural systems; students experience with agricultural land use in their countries.

Intended Learning Outcomes:
On successful completion of the module students are able to remember and identify different crops, farm animals, machines and implements. They will be able to describe farming systems esp. the difference of organic and conventional systems. They will understand farm management methods and interactions inside farming systems. The students can classify land-use systems

worldwide and are able to explain the main elements and to evaluate the sustainability and resource impact.

Teaching and Learning Methods:
Lectures providing theoretical foundations. Examples will be given during the lectures.
Short field trips to farms and university research station, demonstrating crops, animals, technical equipment.
Short discussion sessions.

Media:
Power Point.

Reading List:
Tba

Responsible for Module:
Dr. Hans-Jürgen Reents; Dipl. Ing. Max Kainz - Lehrstuhl für Ökologischen Landbau und Pflanzenbausysteme Liesel Beckmann Str. 2, 85354 Freising, 08161/71 - 3778, reents@wzw.tum.de, kainz@wzw.tum.de

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

For further information in this module, please click campus.tum.de or here.

Module Description

WZ4094: Landscape Management - Application Study | Landscape Management - Application Study

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 75

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

Description of Examination Method:
The attainment of learning outcomes is demonstrated by project work. Students show their ability to work in a team and reach the defined objectives of a project assignment within a given period of time applying suitable methods and concepts of spatial ecology, landscape planning, GIS and remote sensing. Students prepare and deliver a project presentation (45% of module grade) of ca. 10 min per team member and a project report (55% of module grade) of ca. 5 pages per team member demonstrating their capacity to communicate their approach, findings, and conclusions in a concise, scientifically sound and convincing manner, both orally and in writing.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
The successful completion of the modules "Inventory Methods and GIS", "Remote Sensing and Image Processing", "“Spatial Ecology" and "Landscape Planning" or equivalent skills are required, courses on scientific writing and reporting recommended

Content:
- Implementation of GIS and RS techniques.
- Implementation of theoretical concepts of Spatial Ecology;
- Implementation of theoretical concepts of Landscape Planning;
- Oral presentation of findings;
- Elaboration of a final report.

Intended Learning Outcomes:
Upon successful completion of the module, 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 spatial ecology, landscape planning, remote sensing and GIS techniques;
- contribute to context-dependent 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", "Spatial Ecology", "Landscape Planning" is also to be used for the Application Study, among others: Haaren, C. v., Lovett, A. & C. Albert (2019): Landscape Planning with Ecosystem Services – Theories and Methods for Application in Europe. Springer Nature, Dordrecht.

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
For further information in this module, please click campus.tum.de or here.

Module Description

WI001164: Modeling and Optimization in Energy Markets | Modeling and Optimization in Energy Markets

Version of module description: Gültig ab summerterm 2017

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

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

Description of Examination Method:
The module examination consists of laboratory assignments. Students are paired into groups of two (or three) and will work on two case study projects throughout the semester. Each group is evaluated based on their performance in each project, and each project requires the submission of a written report and an in-class presentation of their work. Therefore, students must submit two written reports and give two presentations overall. The presentations will be held on the last two sessions of the course, each group presenting one project on each session.

The reports are a means to assess the students' understanding of theories and methods, their ability to apply them to real world problems, and to implement their solution using a programming language. The presentations measure the students' ability to structure and present their results, connect them with state-of-the-art methods and theories, and present them in a scientific way. The students' reaction to questions and their critical analysis of their work reflect their ability to defend the results obtained based on rigorous scientific reasoning.
The final grade consists of a weighted average encompassing both projects. Each project will be weighted at 50%, and the project components will be such that the report weighs 70% and the presentation 30%.

Students will require the MATLAB skills they have learned during the course to carry out their project work, as well as all material and content that is presented during the course.

Repeat Examination:
Next semester

(Recommended) Prerequisites:

Content:
The course is an introduction to modelling and optimisation in the energy markets. During this course, students will learn how to use Matlab and solve some optimization problems using this tool. Furthermore, they will have the opportunity to understand optimisation theory and the basics of financial mathematics used in the energy markets. Additionally, some applications will be presented and analysed, while giving an overview of possible future research topics.

Intended Learning Outcomes:
Upon successful completion of this module, students will be able to use MATLAB as a tool to build standard mathematical models (1), to analyse statistical data sets (2), and to apply this framework in a financial setting (3). In particular, they will be able to explain the difference between financial products, price these products and model stock prices. They will be able to use MATLAB to (4) solve most linear (convex) optimisation problems, (5) and apply an optimisation mindset to real world problems in the Energy Markets, namely in production planning and storage.

Teaching and Learning Methods:
The module combines various learning methods:
- Basic knowledge, theoretical concepts and practical examples are provided through the lecture;
- A practical component, students will require their laptops with an installed version of MATLAB, as they will apply what is learnt in interactive sessions.

Course content is transferred to students in typical class exposition, where the lecturer presents the course material with the assistance of lecture slides and the whiteboard.
However, students will be asked to apply the learned content immediately, interactively, through exercises and examples that will allow them to develop a practical understanding of the presented concepts.
Students perform these activities in groups of two, to stimulate discussion and reflection, and engage in a positive and informal learning environment.

Media:
Presentation, white board, exercises in MATLAB

Reading List:
Bhattacharyya, S. (2011) Energy Economics – Concepts, Issues, Markets and Governance; Springer 2011.
Erdmann, G. / Zweifel, P. (2010) Energieökonomik – Theorie und Anwendungen; 2. Auflage; Springer 2010.
Ströbele, W. / Pfaffenberger, W. / Heuterkes, M. (2010) Energiewirtschaft – Einführung in Theorie und Politik; 2. Auflage; Oldenbourg 2010.

Responsible for Module:
Wozabal, David; Prof. Dr. rer. soc.

Courses (Type of course, Weekly hours per semester), Instructor:
Modeling and Optimization in Energy Markets (WI001164, englisch) (Vorlesung, 4 SWS)
Kiszka A
For further information in this module, please click 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 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 75

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

Description of Examination Method:
In a written exam (Klausur, 60 min), 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 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:
WZ2731Hydrometeorology 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 SWAT+
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 quasi-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. SWAT+), 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)
Alcamo L, Broich K

Field Course in Applied Hydrometeorology (Vorlesung mit integrierten Übungen, 3 SWS)
Menzel A [L], Lüpke M, Menzel A
For further information in this module, please click campus.tum.de or here.

Module Description

WZ4206: Material Flow Management and Applications | Material Flow Management and Applications

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 105	**Contact Hours:** 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 or here.

Module Description

BGU38023: Engineered Natural Treatment Systems | Natürliche Aufbereitungsverfahren

Version of module description: Gültig ab winterterm 2016/17

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 teached 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)
Aumeier B
For further information in this module, please click campus.tum.de or here.

Module Description

ED160017: Sustainable Manufacturing | Nachhaltige Produktion [SuM]

Version of module description: Gültig ab winterterm 2022/23

Module Level: Master	**Language:** German/English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 105	**Contact Hours:** 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 (Vorlesung, 2 SWS)
Zäh M, Wörle M, Paul M, Pahlevani Qomi K, Sippl F

Sustainable Manufacturing - Exercise (Übung, 1 SWS)
Zäh M, Wörle M, Sippl F
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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.
Chiffoleau, 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 or here.

Module Description

WZ2719: Landscape Planning | Landscape Planning

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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; 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 “Landscape Planning – lecture”: 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 “Landscape Planning – seminar”: 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

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 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

Module Level: Master	**Language:** German/English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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, Kerekes A, Kleeberger H
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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 agribusinsess 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:
People in Organizations: Managing Change and Sustainability in Agribusiness and Food Industry (WZ1563, WI001205, englisch) (Seminar, 4 SWS)
Bitsch V [L], Owsianowski J, Bitsch V
For further information in this module, please click campus.tum.de or here.

Module Description

WZ4082: Plantation Forestry and Agroforestry | Plantation Forestry and Agroforestry

Version of module description: Gültig ab summerterm 2024

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

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

Description of Examination Method:
The assessment for this module is a 90-minute written examination (Klausur) designed to evaluate students' comprehensive understanding and application of key concepts in Plantation Forestry and Agroforestry within the context of international forest and climate policy. The exam will encompass a variety of question types, aimed at testing the students' abilities to critically analyze and address the complexities of plantation and agroforestry management, including the evaluation of impacts, and the application of silvicultural techniques for sustainable plantation and agroforestry systems. Students will be expected to demonstrate their understanding of the role of these land-use systems globally and develop strategic management options that align with international climate goals. Through theoretical scenarios and practical problem-solving questions, the exam will challenge students to integrate their knowledge across topics, from assessing systems to conceptualizing management approaches, ensuring they are equipped with the critical thinking and skills necessary for addressing the challenges in land use systems involving woody components.

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:
Upon successful completion of this module, students are 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 agroforest 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. 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. Agroforesty: 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 or here.

Module Description

WZ4197: Protected Areas Biodiversity and Management | Protected Areas Biodiversity and Management

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 60

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

Description of Examination Method:
The final examination is a 90-minute written test assessing students' understanding in the field of protected areas biodiversity and its management. This examination evaluates the comprehension of the global perspective on ecosystems and ecosystem services, the ability to explain threats and management strategies in the context of ecosystem utilization and protection and the knowledge and reflection on modern techniques in the management and monitoring of protected areas.

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 word as carriers of natural biodiversity; habitat types 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: Tools for protecting habitats, design of management plans, visitor management, best practice examples and management guidelines in sustainable biodiversity and habitat protection conservation planning and project development, project monitoring and evaluation and problems in protected area management.

Intended Learning Outcomes:
On successful completion of the module students are able:

- to put ecosystems and its utilisation options as well as its threats into a global perspective
- to give clear options for further management, both regarding utilisation and protection
- to use and reflect new techniques for better management and monitoring of protected areas

Teaching and Learning Methods:
This module integrates the lectures "Protected Area Management" and "Biodiversity in Protected Areas". The lecture content is delivered through PowerPoint presentations and group work, blending interactive teaching methods with traditional presentation techniques. Students will apply their theoretical knowledge by working on case studies in groups, where they will evaluate, develop and present management concepts related to protected areas. The students learn to critically analyze and reflect on conservation management strategies and engage in intensive discussions, enhancing their skills in scientific communication at an academic level.

Media:
PowerPoint Presentation

Reading List:
J. Schultz (2005): The Ecozones of the World: Ecological Divisions of the Geosphere. Springer, Berlin. 459p.
M. Lockwood, G. Worboys, A. Kothari (2006). Managing Protected Areas; A Global Guide. Routledge 810p
LN Joppa, JEM Bailie, JG Robinson (2016) Protected Areas: Are They Safeguarding Biodiversity? Wiley 266p

Responsible for Module:
Kühn, Ralph; Apl. Prof. Dr. agr. habil. ralph.kuehn@tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Biodiversity in Protected Areas (Vorlesung, 2 SWS)
Kühn R [L], Gula R, Theuerkauf J

Protected Area Management (Vorlesung, 2 SWS)
Kühn R [L], Gula R, Theuerkauf J
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 105	**Contact Hours:** 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 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 start 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 programing).
- 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, Mokhtari A, Camenzind M
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 10	**Total Hours:** 300	**Self-study Hours:** 150	**Contact Hours:** 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 programing 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 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 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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:
Kögel-Knabner, Ingrid, Prof. Dr. rer. nat. Dr. rer. nat. habil. koegel@tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Remediation of Contaminated Sites – Investigation and remediation methods (Seminar, 2 SWS)
Heister K, Höschen C

Remediation of Contaminated Sites - Regeneration of contaminated soils (Vorlesung, 2 SWS)
Zare M
For further information in this module, please click campus.tum.de or here.

Module Description

LS20016: Rhizosphere Research | Rhizosphere Research

Version of module description: Gültig ab winterterm 2022/23

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 porose media, such as the soils-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)
Hafner B, Zare M

Soil Biophysics (Vorlesung, 2 SWS)
Zare M
For further information in this module, please click 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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:
Research Methods and Economic Research Project (WZ1559, WZ1674) (Seminar, 4 SWS)
Bitsch V [L], Bitsch V
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2720: Renewable Energy Technologies | Renewable Energy Technologies

Version of module description: Gültig ab winterterm 2015/16

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 proof 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)
Kerscher F [L], Kerschbaum A, Kerscher F, Mörtenkötter H, Schifflechner C, Schweiger B, Westermeier M
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2737: Remote Sensing and Image Processing | Remote Sensing and Image Processing

Version of module description: Gültig ab summerterm 2024

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

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

Description of Examination Method:
The module exam is a project work consisting of exercises, a presentation (10 Min) and a final report (ca. 15 pages). “Hands on” exercises with state of the art software packages are employed to train the main image processing steps and to assess the students’ understanding of the implementation of the basic concepts of remote sensing from data acquisition to data analysis. During the exercises, regular discussions measure the student’s ability to develop an idea from initial concepts to the complete picture within a given time frame, delivering interim results at relevant milestones (35% of the module grade). Each student prepare and deliver a presentation (20% of the module grade) on a topic related to remote sensing, demonstrating their ability to understand a technical/scientific subject, analyze and evaluate facts and influencing factors, summarize and present the issue to an audience, and lead a discussion on the issue presented. In the final report (45% of the module grade), students also demonstrate that they have acquired in-depth knowledge of the specific image analysis software packages and their components, of different analysis concepts, and that they are prepared to evaluate the existing situation as imaged by the respective remote sensing data set. They also demonstrate their ability are able to create new geodata layers suitable for analysis in an integrating GIS environment.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Module " Introduction to GIS and Remote Sensing " of the 1st semester of the Master Program "Sustainable Resource Management" passed, computer skills at least at working level.

Content:
Implementation of data interpretation and information extraction concepts and techniques offered in "hands on" exercises using 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 various parameters from RS image;
10. Change detection concepts;
11.Integration of Remote Sensing and GIS;
12. Accessing and data downloading from geodata providers.

Intended Learning Outcomes:
At the end of the Remote Sensing and Image Processing (RSIP) module, students are able to:
- decide on appropriate datasets for using remote sensing for various spatial problems;
- work with remote sensing image datasets (access databases, download and open, geocode/ georeference, extract various parameters, spectral signatures and calculate indices);
- develop appropriate interpretation keys, visualize and enhance the data set for thematic objective;
- perform unsupervised and supervised classifications;
- prove the quality of the results by an assessing the accuracy, perform a change detection study, and export the results as GIS layer;
- work with image processing software tools;
- deliver an oral presentation to communicate their findings on a selected remote sensing topic in a clear and comprehensible manner to an audience;
- write a persuasive report based on their results according to scientific writing guidelines.

Teaching and Learning Methods:
Through the use of advanced image processing software packages, the concepts explained in theory are practiced in “hands on” exercise and discussed using different data types, applying the “just in time teaching (JiTT)” technique. This is accompanied by presentations by each student on selected remote sensing topics.

Media:
Image processing software and tutorials, prepared exercises, different data types

Reading List:
The literature recommended within the Module " Introduction to GIS and Remote Sensing " should be used.

* Remote Sensing and Image Interpretation by Lillesand, Kiefer, and Chipman (2015). * Remote Sensing Digital Image Analysis - an introduction by Richards, Jia (2005). * Internet tutorials from ESA, DLR, NASA.

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 or here.

Module Description

LS20023: Soil and Plant Hydrology | Soil and Plant Hydrology

Version of module description: Gültig ab winterterm 2022/23

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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:
Seminar on Water, nutrients and carbon exchange across soil-plant-atmosphere continuum (Seminar, 2 SWS)
Zare M [L], Hafner B, Zare M

Soil plant water relationship (Vorlesung, 2 SWS)
Zare M [L], Zare M
For further information in this module, please click campus.tum.de or here.

Module Description

WI001165: Sustainable Entrepreneurship - Getting Started | Sustainable Entrepreneurship - Getting Started

Version of module description: Gültig ab summerterm 2017

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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

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 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

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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, englisch) (Seminar, 4 SWS)
Bitsch V [L], Bitsch V, John J, Owsianowski J
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2727: Sustainability of Food Chains | Sustainability of Food Chains

Version of module description: Gültig ab winterterm 2015/16

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

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

Description of Examination Method:
Combination of Poster and oral presentation provides to assess the students ability to conduct a life cycle analysis of a special food product. The poster needs a very concentrated presentation, focus on the important information and factors and shows the students capability to understand the principles of the LCA and the special food production process.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
Attendance in Module 4209 and 4210 is recommended.

Content:
Food chains of processed food, from agricultural production via processing to packed product unit in a food store, principles of life cycle analysis, assessment criteria, energy input output ratio, energy efficiency, CO2 emission, carbon footprint, virtual water
LCA calculation and calculation program (Umberto).

Intended Learning Outcomes:
At the end of the module the students are able to understand food chains. They can describe and apply life cycle analysis to processed food products. They are able to assess energy and emission impact of different crop and animal production system and processing procedures. The will get basic skills of the software Umberto.

Teaching and Learning Methods:
Teachers Presentations Life cycle analysis, food chain, energy, CO2 emission and water impacts, students contributions, special aspects of processing paper reading for contributions to group discussions and outline of the final presentation.

Media:
Presentation notes, computer program.

Reading List:
Tba

Responsible for Module:
Dipl. Ing. Max Kainz - Lehrstuhl für Ökologischen Landbau und Pflanzenbausysteme Liesel Beckmann Str. 2, 85354 Freising, 08161/71 - 3034, kainz@wzw.tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Sustainabilityof Food Chains
Max Kainz
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2728: Sustainable Land-Use Management | Sustainable Land-Use Management

Version of module description: Gültig ab winterterm 2015/16

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

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

Description of Examination Method:
In a Power Point (or comparable tool) supported oral presentation the students can show, how they identify a special issue of farm management related to terms of sustainability. In the further outline of the presentation, the students will show how to discuss the topic based on recorded results from published papers, to explain conclusions and to suggestsolutions on improved sustainability.

Repeat Examination:
Next semester

(Recommended) Prerequisites:
None

Content:
Agricultural systems and their relation to natural and human resources; site, economic and social conditions, regional and global,
adaptation of farm management techniques to principles of sustainability, research and scientific results, terms of politics and social debate, aims and scenarios for future development
Topics selected participative with the students.

Intended Learning Outcomes:
On successful completion of the module students are able to identify special problems of sustainability in farm management, economic and social conditions, to analyze the technical, social and economic impacts and to evaluate them on the background of criteria of sustainability. They will be able to create solutions for critical impacts.

Teaching and Learning Methods:
Lectures provide facts, background and theoretical foundations.

Papers have to be read and used in group work.
Group work.

Media:
Power Point Presentations
Flip Chart
Pin wall, Metaplan technique

Reading List:
Tba

Responsible for Module:
Dipl. Ing. Max Kainz; Dr. Hans-Jürgen Reents - Lehrstuhl für Ökologischen Landbau und Pflanzenbausysteme, Liesel Beckmann Str. 2, 85354 Freising, 08161/71 - 3778, kainz@wzw.tum.de, reents@wzw.tum.de

Courses (Type of course, Weekly hours per semester), Instructor:
Case Studies of Land-Use Management
Hans-Jürgen Reents, Max Kainz
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2734: Soil Protection | Soil Protection

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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. They prove their understanding of the major environmental factors determining food production and are required to design adequate land-use methods. They prove their understanding of the major factors determining the fate of pollutants in soil and are required to design scenarios to manage and remediate brownfields.

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 kaolinitc 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:
The lecture presents and discusses the state of soil degradation and how to avoid and to meliorate it.

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 or here.

Module Description

WZ2936: Sustainable and Environmental Regulations | Sustainable and Environmental Regulations

Version of module description: Gültig ab summerterm 2024

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

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

Description of Examination Method:
Mode of assessment: presentation (around 60 min in total, ca. 30 min per seminar course, contributing in equal weightage to the module grade), complemented by a written executive summary on the topic of the presentation (up to 5 pages per seminar course).
The presentation is a means to measure the students' ability to understand the context an d 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 indicates the capacity of the students to summarize findings and address their implications 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.

Content:
Course 1 "Sustainable Development and Regime Type (SDRT)":
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 (MEA)":
The seminar introduces Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (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 analyzing 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 or here.

Module Description

BGU70005: Transportation Economics | Transportökonomie
[Transportation Economics]

Version of module description: Gültig ab winterterm 2017/18

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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 he 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
For further information in this module, please click campus.tum.de or here.

Module Description

BGU38033: Planning the Urban Water-Energy-Food Nexus | Urban Water-Energy-Food Nexus Planung

Version of module description: Gültig ab summerterm 2019

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 3	**Total Hours:** 90	**Self-study Hours:** 60	**Contact Hours:** 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 project. This project will be conducted in small groups of students, whereby an individual thematic focus will be defined for each student. The aim of the project is to prove understanding of basics of different technical and non-technical components of 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.

Repeat Examination:

(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

Teaching and Learning Methods:
The module will be taught as a lecture with seminar parts. It will explain major content in form of 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:
Presentations, group work

Reading List:
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.
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:
Daphne Keilmann-Gondhalekar

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
For further information in this module, please click campus.tum.de or here.

Module Description

WZ0528: Urban Forestry | Urban Forestry

Version of module description: Gültig ab winterterm 2023/24

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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; Prof. Dr. agr. habil.

Courses (Type of course, Weekly hours per semester), Instructor:
Urban Forestry (Vorlesung mit integrierter Übung) (Vorlesung, 4 SWS)
Rötzer T, Pauleit S, Reischl A, Rahman M, Torano Caicoya A, Lupp G
For further information in this module, please click campus.tum.de or here.

Module Description

WZ1344: Urban Agriculture | Urban Agriculture

Version of module description: Gültig ab winterterm 2023/24

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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:
Edible Cities (Seminar, 2 SWS)
Egerer M

Urban Agriculture (Vorlesung, 2 SWS)
Egerer M [L], Egerer M
For further information in this module, please click 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 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 120	**Contact Hours:** 30

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 presentation (10 minutes per person) complemented by a written precis (2,5 A4-pages in Arial and font size 10-11 per person), both as a group work with approx. 4 persons per group. The presentation and the written work each make up 50 % of the overall grade. 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. Thereby, students have to demonstrate the understanding of appropriate handling of special waste, the description of status quo of special waste treatment and the relevant legal background based on literature research; they have to show, that they are able to analyse problems of special wastes and to transmit existing solutions; they have to present respective scientific results both in oral (by the presentation itself and by answering questions to the presentation) and written form.

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 “Waste of Electrical and Electronic Equipment (WEEE)” as one typical special waste stream:
- Origin, types and properties of WEEE,
- Collection methods,
- Treatment methods,
- Waste as a source of raw material,
- Energetic utilization,

- Legal specification,
- Design for recycling and waste avoidance.

Intended Learning Outcomes:
Upon successful completion of this module, students are able to:
- understand treatment measures to handle the waste for avoiding or reducing impacts on the environment and human health,
- understand the relevant legal background for sustainable waste handling in European Union,
- analyze problems concerning the special wastes,
- transmit existing solutions to other waste and new products,
- explain and discuss the problems, methods and results of a selected topic by a presentation to and with an auditorium, summarize the most important issues in a short paper.

Teaching and Learning Methods:
The module consists of a lecture part, providing the theoretical foundations of the course content. The main part is a seminar, in which the students elaborate and present a special topic and the lecturer gives feedback to the students' work. The students have to analyse problems regarding a special waste collaboratively in group work by 2-4 students studying specialist literature. At the end, they have to prepare a presentation and a written summary including problem statement and conclusions as homework. The students are supervised by the lecturer.

Media:
PowerPoint Presentation

Reading List:
Goodship, V., Stevels, A., Huisman, J. (Eds.), 2019: Waste Electrical and Electronic Equipment (WEEE) Handbook.
A volume in Woodhead Publishing Series in Electronic and Optical Materials. Elsevier, Second Edition, https://doi.org/10.1016/C2016-0-03853-6
Hester, R.E., Harrison, R.M. (Eds.), 2009: Electronic waste management: design, analysis and application, Cambridge, RSC Publishing, 280 pp., ISBN 978-0-85404-112-1
Other literature, presented in introductory lecture.

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 or here.

Module Description

LS10006: Vertical Farming (MSc.) | Vertical Farming (MSc.)

Version of module description: Gültig ab winterterm 2021/22

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

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

For further information in this module, please click 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 2023/24

Module Level: Master	**Language:** German/English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 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 report (report of approx. 10 pages; 75% of the grade) and is supplemented by a presentation (approx. 20 min.; 25% 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 a series of guest lectures by internationally or nationally renowned scientists. The guest lecturers presented selected topics on ecology, nature conservation, biodiversity, and sustainability research.

Students prepare for the lecture by reading the guest's publications and related studies. As part of the seminar, they introduce the respective guest and the topic and discuss the presentations in comparison with other contributions.
They also document how the specialist content is prepared and presented. Based on publications on the lecture topics and presentations, the students analyze the methods and techniques used by the scientists to convey their specialist content. This is done in a written report, which is produced at the end of the seminar.

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 the respective lectures by reading the publications of the visiting scientists and related studies. In a written report, they document how the technical content and other scientific topics are prepared and discussed. Building on the guests' CVs, publications and lectures, the students analyze the methods and techniques the scientists use to convey their specialist content. By critically analyzing publications and specialist lectures, students learn how scientists communicate their results to the public. By comparing and discussing several guest lectures as part of the seminar, students learn the essential techniques for efficiently conveying specialist knowledge verbally and in writing. The combination of oral presentation and written report meets the requirements profile of graduates in the professional fields of ecosystem management, nature conservation, landscape planning and public relations.

Media:
PowerPoint presentations, script, 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)
Häberle K, Kollmann J, Leonhardt S

Seminar Wissenschaftliche Grundlagen und Anwendungen in der Praxis (Seminar, 2 SWS)
Leonhardt S [L], Kollmann J, Häberle K
For further information in this module, please click campus.tum.de or here.

Module Description

WZ2735: World Soil Resources | World Soil Resources

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 78	**Contact Hours:** 72

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 according to the international soil classification system World Reference Base for Soil Resources (WRB)
• Chemical, biological and physical properties of soils
• Genesis of soils as the result of soil-forming factors
• Soil survey using the WRB Field Guide
• Soil classification according to the international system WRB
• 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:
1. Zech W, Schad P, Hintermaier-Erhard G (2022): Soils of the World. Springer, Heidelberg.
2. IUSS Working Group WRB (2022): World Reference Base for Soil Resources. 4th edition. International Union of Soil Sciences (IUSS), Vienna, Austria.

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, Just C
For further information in this module, please click 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 summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** summer semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 90	**Contact Hours:** 60

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

Description of Examination Method:
The examination consist of a Research Paper (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:
Upon successful completion of the module, students are able to:
- understand important ecological concepts in wildlife management;
- understand the importance of the human dimension in wildlife management;
- analyze 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:
This module integrates the lecture "Wildlife Management" with the seminar "Wildlife-Human Interaction". The lecture utilizes PowerPoint presentations and group work, combining engaging teaching methods with traditional presentation techniques. In the seminar, students apply theoretical knowledge through case studies and group work and presenting conflict resolution concepts in various wildlife-human interaction scenarios. Students will independently review relevant literature and enhancing their skills in scientific communication and conflict resolution at an academic level.

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; 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 or here.

Module Description

WZ6432: Wildlife and Conservation Biology | Wildlife and Conservation Biology

Version of module description: Gültig ab summerterm 2024

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter semester
Credits:* 5	**Total Hours:** 150	**Self-study Hours:** 75	**Contact Hours:** 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 own research project proposal to practice their scientific communication skills and to transfer the theoretical knowledge to practical projects. Grading from the written exam and the project work are weighed in the ratio 6:4.

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 Sustainability
3. Factors affecting terrestrial and aquatic Biodiversty
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 Biodiverstiy of terrestial 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; Prof. Dr. agr. habil.

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

For further information in this module, please click campus.tum.de or here.

Course Achievement | Studienleistungen

Module Description

WZ4061: Internship | Internship

Version of module description: Gültig ab winterterm 2022/23

Module Level: Master	**Language:** English	**Duration:**	**Frequency:** winter semester
Credits:* 10	**Total Hours:** 300	**Self-study Hours:** 300	**Contact Hours:** 0

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

Description of Examination Method:
After completion of the internship, the student has to hand in an internship report and a certification letter where the employer verifies the duration with eventual miss-outs and the kind of work which was performed from the trainee.

Repeat Examination:

(Recommended) Prerequisites:
None

Content:
According to the study rules for the Master Program "Sustainable Resource Management", every student has to serve an internship outside his/her home country with a minimum duration of 7 weeks (10 ECTS credits). The internship should act as a possibility for the trainee to get insight into the different areas of operation for sustainable resource managers. The student should be enabled to survey his individual career aspirations and to contact potential employers. The student has to search for an internship by his/her own and it has to be scheduled in a way that it does not conflict with the lecture periods. A recommended time spell for the internship is between the second and third semester (August October). The internship can be split into two parts with a minimum duration of one month each. Further divisions are possible just due to significant reasons, but have to be approved in advance by the internship advisor. It is possible to serve the internship in different organisations; however the minimum duration of one month must be kept. The internship must take place outside a university. Recommended are organisations that are potential employers. The program coordinator and the internship advisor can give guidance regarding choices of possible organisations.

Intended Learning Outcomes:
On successful completion of the module, students are able to apply their theoretical knowledge in a practical environment. Furthermore, they are able to incorporate themselves into new companies and to analyze and assess business organizations.

Teaching and Learning Methods:

Media:

Reading List:

Responsible for Module:
Jositz-Pritscher, Ingrid, Dr. Praktikantenamt Weihenstephan www.praktikantenamt-weihenstephan.de Alte Akademie 1, 85354 Freising, 08161 / 71-3710 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 or here.

Master's Thesis | Master's Thesis

Module Description

WZ2754: Master's Thesis | Master's Thesis

Version of module description: Gültig ab winterterm 2024/25

Module Level: Master	**Language:** English	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 30	**Total Hours:** 900	**Self-study Hours:** 885	**Contact Hours:** 15

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, 5 pages). Formal requirements for the Master’s Thesis as well as for the Master’s Thesis Proposal are communicated in the seminar “Master’s Thesis Proposal”.

By writing the Master`s Thesis, students demonstrate that they are able to identify a research gap from their respective field and to design target-oriented research to close the gap and solve respective research questions. They demonstrate that they can independently conduct a research project and work on it in a solution-oriented manner, taking into account appropriate scientific methods. They demonstrate, that they are able to present their research in a scientific paper with a logical outline and scientific writing style.

Repeat Examination:
Next semester / End of Semester

(Recommended) Prerequisites:
The Master's Thesis should be the last module in the Master's program. For this reason, sufficient modules should have been taken in order to be able to finish the program with the completion of the Thesis. Details on this are regulated by the Academic and Examination Regulations (FPSO). Both, skills in scientific writing and knowledge in the selected research field, are the basis of developing and conducting research and writing the Master’s Thesis.

Content:
The student selects a topic of his/her own choice on which he/she will work according to scientific methods. 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 the supervision of a qualified examiner, who has the approval to conduct exams at TUM. It is recommended to choose an examiner of the “Sustainable Resource Management” Degree Program. The examiner will in the end grade the Master’s Thesis. The Thesis can be done internally at TUM, or as an external Thesis outside the university, abroad or in the student’s home-country, with previous consent of the examiner from TUM.

Intended Learning Outcomes:
Upon successful completion of the Master’s Thesis module, 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 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 research designs addressing the scientific questions 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 master student is guided in literature search, scientific reading, solving problems, practicing, designing a research project, creating a scientific Proposal and a scientific Thesis, constructive criticizing of their own work, and revising it on the basis of feedback, all parts under time constraints. Therefore, the learning methods are introduced in 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 or here.

Requirement Proof of Proficiency in German | Nachweis Deutschkenntnisse

Module Description

WZ8000: Accredited Requirement Proof of Proficiency in German | Anerkennung Nachweis Deutschkenntnisse

Version of module description: Gültig ab summerterm 2018

Module Level:	Language:	Duration:	Frequency:
Credits:*	**Total Hours:**	**Self-study Hours:**	**Contact Hours:**

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 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 4	**Total Hours:** 120	**Self-study Hours:** 60	**Contact Hours:** 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)
Hanke C, Hoff L
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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, Comparato G, Dechant S, Detcheva-Knippelmeyer I, Körner C, Kostial M, Kummer-Rock A, Lebling-Gemaljevic J, Meuschel G, Mielert A, Schmidt-Bender S

Deutsch als Fremdsprache A2.1 - EuroTeQ (Seminar, 4 SWS)
Kostial M
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 6	**Total Hours:** 180	**Self-study Hours:** 120	**Contact Hours:** 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, Comparato G, Dechant S, Feistle C, Grigorieva A, Hagner V, Körner C, Kovacs O, Kummer-Rock A, Steidten R, Thiessen E
For further information in this module, please click 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

Module Level: Bachelor/Master	**Language:** German	**Duration:** one semester	**Frequency:** winter/summer semester
Credits:* 8	**Total Hours:** 270	**Self-study Hours:** 180	**Contact Hours:** 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)
Hanke C, Reulein C, Zerfass A

For further information in this module, please click campus.tum.de or here.

Alphabetical Index

| Soils and Soil Management 380

A

[WZ8000] Accredited Requirement Proof of Proficiency in German | Anerkennung Nachweis Deutschkenntnisse 559 - 560
[WZ0246] Advanced Concepts and Methods in Urban Ecosystems | Advanced Concepts and Methods in Urban Ecosystems 392 - 395
[WZ2757] Advanced Environmental and Natural Resource Economics | Advanced Environmental and Natural Resource Economics 402 - 404
[CS0126] Advanced Seminar in Circular Economy and Sustainability Management | Advanced Seminar in Circular Economy and Sustainability Management [ASCESM] 390 - 391
[SG810003] Advanced Statistics | Advanced Statistics 27 - 28
Agricultural Land-Use Systems | Agricultural Land-Use Systems 364
[WZ2721] Agriculture Raw Materials and their Utilization | Agriculture Raw Materials and their Utilization [ARM&U] 348 - 349
[WZ2721] Agriculture Raw Materials and their Utilization | Agriculture Raw Materials and their Utilization [ARM&U] 396 - 397
[WZ2736] Analytical Characterization of Soil Resources | Analytical Characterization of Soil Resources 386 - 387
[WZ2736] Analytical Characterization of Soil Resources | Analytical Characterization of Soil Resources 400 - 401
[BGU38019] Anaerobic Processes and Energy Recovery | Anaerobtechnik und Energierückgewinnung 388 - 389
[SZ0118] Arabic A1.1 | Arabisch A1.1 29 - 30
[CLA90211] Art and Politics | Kunst und Politik 306 - 307
[WZ2726] Assessment of Sustainability in Agriculture - Theory and Case Studies | Assessment of Sustainability in Agriculture - Theory and Case Studies 366 - 367
[WZ2726] Assessment of Sustainability in Agriculture - Theory and Case Studies | Assessment of Sustainability in Agriculture - Theory and Case Studies 398 - 399

B

[IN2124] Basic Mathematical Methods for Imaging and Visualization | Basic Mathematical Methods for Imaging and Visualization 444 - 446

[CLA30257] Big Band | Big Band 295 - 296

C

Carl von Linde-Akademie | Carl von Linde-Akademie 237
[BGU62039] Case Studies of Sustainable Urban Developments and Infrastructure | Fallstudien nachhaltiger Quartiers-, Stadt- und Infrastrukturentwicklungen [FNQSI] 430 - 432
[SZ0209] Chinese A1.1 | Chinesisch A1.1 44 - 45
[SZ0211] Chinese A2.1 | Chinesisch A2.1 46 - 47
[WZ1590] Climate Change Economics | Climate Change Economics 313 - 315
[WZ1590] Climate Change Economics | Climate Change Economics 405 - 407
[WZ2730] Climate Change - Science, Impacts and Adaptation, Mitigation | Climate Change - Science, Impacts and Adaptation, Mitigation 378 - 379
[WZ2730] Climate Change - Science, Impacts and Adaptation, Mitigation | Climate Change - Science, Impacts and Adaptation, Mitigation 408 - 409
Climate, Air and Water | Climate, Air and Water 372
[CLA10555] Communication and Facilitation in Project Teams | Communication and Facilitation in Project Teams 251 - 252
[CLA30267] Communication and Presentation | Kommunikation und Präsentation 237 - 238
[CLA20267] Communication and Presentation | Kommunikation und Präsentation 271 - 272
[POL40300] Computational Methods | Computational Methods 42 - 43
[CLA20231] Concepts of Human Being | Mensch und Menschenbilder 269 - 270
[CLA11313] Conflict Management and Conducting Discussions | Konfliktmanagement und Gesprächsführung 263 - 264
Course Achievement | Studienleistungen 554
[WZ0812] Cultural Competence: Choir and Orchestra | Kulturelle Kompetenz: Chor- und Orchester 308 - 309

D

[CLA20705] Diversity and Conflict Management | Diversität und Konfliktmanagement 279 - 280
[SZ1601] Dutch A1 | Niederländisch A1 137 - 138
[SZ1602] Dutch A2 | Niederländisch A2 139 - 140

E

[WZ0322] Ecological Colloquium: Scientific Foundations and Applications in Practice | Ökologisches Kolloquium: Wissenschaftliche Grundlagen und Anwendungen in der Praxis [SciTravels] 545 - 547
[WZ4009] Ecology of Mountain Forests | Ökologie des Gebirgswaldes 145 - 146
[WI001204] Economics of Water Use, Regulation and Markets | Economics of Water Use, Regulation and Markets 417 - 419
[CLA10813] Economic Thinking: Economics | Volkswirtschaftlich Denken 257 - 258
Elective Courses | Wahlmodule 310
Elective Modules | Elective Modules 388
[WZ2724] Emission Control in Land-Use and Animal Husbandry | Emission Control in Land-Use and Animal Husbandry 362 - 363
[WZ2724] Emission Control in Land-Use and Animal Husbandry | Emission Control in Land-Use and Animal Husbandry 426 - 427
[POL62200] Energy Transformation | Energy Transformation 412 - 414
[BGU38023] Engineered Natural Treatment Systems | Natürliche Aufbereitungsverfahren 473 - 474
[SZ0454] English - Basic English for Scientific Purposes B2 | Englisch - Basic English for Scientific Purposes B2 77 - 78
[SZ04043] English - English in action - What is Art? from B2 | Englisch - English in action - What is Art? ab B2 71 - 72
[SZ0471] English - Intensive Thesis Writers' Workshop C2 | Englisch - Intensive Thesis Writers' Workshop C2 79 - 80
[SZ0453] English - Scientific Presentation and Writing C2 | Englisch - Scientific Presentation and Writing C2 75 - 76
[SZ0406] English - Writing Academic Research Papers C2 | Englisch - Writing Academic Research Papers C2 73 - 74
[IN9017] Entrepreneurship | Existenzgründung 69 - 70
[WZ1876] Entrepreneurship in the Agricultural and Horticultural Industry | Entrepreneurship in der Agrar- und Gartenbauwirtschaft 423 - 425
[WI000286] Environmental and Natural Resource Economics | Environmental and Natural Resource Economics 310 - 312
[WI000286] Environmental and Natural Resource Economics | Environmental and Natural Resource Economics 415 - 416
Environmental Economics and Policy | Environmental Economics and Policy 310
[WZ2732] Environmental Monitoring and Data Analysis | Environmental Monitoring and Data Analysis 376 - 377
[WZ2732] Environmental Monitoring and Data Analysis | Environmental Monitoring and Data Analysis 428 - 429
[CLA20230] Ethics and Responsibility | Ethik und Verantwortung 65 - 66

[WZ0228] Exercises in Precision Agriculture and Plant Phenotyping | Exercises in Precision Agriculture and Plant Phenotyping 420 - 422
[LS20022] Experimental Methods in Soil and Plant Hydrology | Experimental Methods in Soil and Plant Hydrology 410 - 411
[WZ6326] Experimental Restoration Ecology | Experimentelle Renaturierungsökologie [ExpRes] 81 - 82

F

Fields of Specialization | Vertiefungsbereiche 310
[WZ4189] Fisheries and Aquatic Conservation | Fisheries and Aquatic Conservation 336 - 338
[WZ4189] Fisheries and Aquatic Conservation | Fisheries and Aquatic Conservation 441 - 443
[WZ4098] Forestry Raw Materials and their Utilization | Forestry Raw Materials and their Utilization 350 - 352
[WZ4098] Forestry Raw Materials and their Utilization | Forestry Raw Materials and their Utilization 436 - 438
[WZ2716] Forest Growth and Forest Operations | Forest Growth and Forest Operations 321 - 323
[WZ2716] Forest Growth and Forest Operations | Forest Growth and Forest Operations 433 - 435
[WZ4161] Forest Management | Forest Management 319 - 320
[WZ4161] Forest Management | Forest Management 439 - 440
[SZ0501] French A1.1 | Französisch A1.1 83 - 84
[SZ0522] French A1.1 + A1.2 | Französisch A1.1 + A1.2 100 - 101
[SZ0502] French A1.2 | Französisch A1.2 85 - 86
[SZ0503] French A2.1 | Französisch A2.1 87 - 89
[SZ0504] French A2.2 | Französisch A2.2 224 - 225
[SZ0505] French B1.1 | Französisch B1.1 90 - 91
[SZ05061] French B1.2 | Französisch B1.2 92 - 93
[SZ0514] French B2 - Communication Course | Französisch B2 - Cours de conversation 94 - 96
[SZ0515] French C1 - Upper Conversation Course | Französisch C1 - Cours de conversation supérieure 97 - 99
[CLA21008] Fundamental Principles of Globalisation | Grundlagen der Globalisierungsforschung 287 - 288

G

[CLA20910] Gender Competence as Core Qualification | Genderkompetenz als Schlüsselqualifikation 283 - 284
General Education Subject | General Education Subject 27
[WZ2717] Genetic Resources Management and Forest Protection | Genetic Resources Management and Forest Protection 324 - 326
[WZ2717] Genetic Resources Management and Forest Protection | Genetic Resources Management and Forest Protection 447 - 449
[SZ0321] German as a Foreign Language A1.1 plus A1.2 | Deutsch als Fremdsprache A1.1 plus A1.2 52 - 53
[SZ0303] German as a Foreign Language A2.1 | Deutsch als Fremdsprache A2.1 48 - 49
[SZ0303] German as a Foreign Language A2.1 | Deutsch als Fremdsprache A2.1 563 - 564
[SZ0322] German as a Foreign Language A2.1 plus A2.2 | Deutsch als Fremdsprache A2.1 plus A2.2 54 - 56
[SZ0322] German as a Foreign Language A2.1 plus A2.2 | Deutsch als Fremdsprache A2.1 plus A2.2 567 - 569
[SZ0304] German as a Foreign Language A2.2 | Deutsch als Fremdsprache A2.2 50 - 51
[SZ0304] German as a Foreign Language A2.2 | Deutsch als Fremdsprache A2.2 565 - 566
[SZ0350] German as a Foreign Language B1.1 | Deutsch als Fremdsprache B1.1 60 - 61
[SZ0323] German as a Foreign Language B1.1 plus B1.2 | Deutsch als Fremdsprache B1.1 plus B1.2 57 - 59
[SZ0351] German as a Foreign Language B1.2 | Deutsch als Fremdsprache B1.2 62 - 64
[CLA10512] Getting More Effective - on My Own and in a Team | Effektiver werden - allein und im Team 249 - 250
[CLA20710] Global Diversity Training | Global Diversity Training 281 - 282
[POL65101] Global Health (MSc.) | Global Health (MSc.) 102 - 103

H

[SZ1304] Hebrew A1.1 | Hebräisch A1.1 116 - 117
[SZ1305] Hebrew A1.2 | Hebräisch A1.2 118 - 119
[CLA11123] How to Produce Your Own Videos | Videos selber machen 241 - 242
[CLA10714] Human Resources Development | Personalentwicklung 253 - 254

[WZ1545] Human Resource Management in Agriculture and Related Industries | Human Resource Management in Agriculture and Related Industries 450 - 451
[WZ2731] Hydrometeorology and Management of Water Resources | Hydrometeorology and Management of Water Resources 372 - 373
[WZ2731] Hydrometeorology and Management of Water Resources | Hydrometeorology and Management of Water Resources 452 - 453

I

[SZ03031] Intensive Course German as a Foreign Language A2.1 | Blockkurs Deutsch als Fremdsprache A2.1 34 - 35
[SZ03031] Intensive Course German as a Foreign Language A2.1 | Blockkurs Deutsch als Fremdsprache A2.1 561 - 562
[SZ03041] Intensive Course German as a Foreign Language A2.2 | Blockkurs Deutsch als Fremdsprache A2.2 36 - 37
[SZ03061] Intensive Course German as a Foreign Language B1.2 | Blockkurs Deutsch als Fremdsprache B1.2 38 - 39
[SZ08011] Intensive Course Portuguese A1 | Blockkurs Portugiesisch A1 40
[SZ08061] Intensive Course Portuguese A2.1 | Blockkurs Portugiesisch A2.1 41
[CLA20424] Intercultural Encounters | Interkulturelle Begegnungen 273 - 274
[CLA11317] Interdisciplinary Lecture Series Environment: Politics and Society | Ringvorlesung Umwelt: Politik und Gesellschaft 265 - 266
[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] 454 - 456
[LS50000] International Climate Strategies / UNFCCC | International Climate Strategies / UNFCCC 457 - 459
[WZ4061] Internship | Internship 554 - 555
[WI001122] Introduction to Business Law (MiM) | Introduction to Business Law (MiM) [BusLawMiM] 120 - 121
[CLA21005] Introduction to Diversity Management | Einführung in Diversity Management 67 - 68
[CLA21005] Introduction to Diversity Management | Einführung in Diversity Management 285 - 286
[WZ1822] Introduction to Economics and Business Ethics | Introduction to Economics and Business Ethics 16 - 18
[CLA21209] Introduction to Scientific Working | Einführung in das wissenschaftliche Arbeiten 291 - 292
[WZ2733] Introduction to Soil Science | Introduction to Soil Science 380 - 381
[WZ2733] Introduction to Soil Science | Introduction to Soil Science 460 - 461

[WI001208] Introduction to Value Chain Economics | Introduction to Value Chain Economics 235 - 236
[WZ1823] Inventory Methods, Statistics and GIS | Inventory Methods, Statistics and GIS 19 - 21
[SZ0602] Italian A1.1 | Italienisch A1.1 108 - 109
[SZ0602] Italian A1.1 | Italienisch A1.1 110 - 111
[SZ0601] Italian A1.1 + A1.2 - Intensive | Italienisch A1.1 + A1.2 - Intensiv 106 - 107
[SZ0605] Italian A1.2 | Italienisch A1.2 112 - 113
[SZ0607] Italian A2.1 + A2.2 - Intensive | Italienisch A2.1 + A2.2 - Intensiv 104 - 105
[SZ0630] Italian B1/B2 Conversation | Italienisch B1/B2 - Corso di conversazione 114 - 115

J

[SZ0705] Japanese A1.1 | Japanisch A1.1 122 - 123
[SZ07052] Japanese A1.1 + A1.2 | Japanisch A1.1 + A1.2 124 - 125
[CLA30258] Jazz Project | Jazzprojekt 297 - 298

K

[SZ1808] Korean A1.1 | Koreanisch A1.1 126 - 127
[SZ1809] Korean A1.2 | Koreanisch A1.2 128 - 129

L

Landscape Management | Landscape Management 339
[WZ4094] Landscape Management - Application Study | Landscape Management - Application Study 341 - 342
[WZ4094] Landscape Management - Application Study | Landscape Management - Application Study 464 - 465
[WZ2719] Landscape Planning | Landscape Planning 339 - 340
[WZ2719] Landscape Planning | Landscape Planning 481 - 482
[WZ2725] Land-Use Systems from Local and Global Perspectives | Land-Use Systems from Local and Global Perspectives 364 - 365
[WZ2725] Land-Use Systems from Local and Global Perspectives | Land-Use Systems from Local and Global Perspectives 462 - 463

[CLA31900] Lecture Series Environment - TUM | Vortragsreihe Umwelt - TUM 301 - 302

M

Management and Protection of Forest Ecosystems | Management and Protection of Forest Ecosystems 319
[POL70045] Master Seminar Business Ethics | Masterseminar Wirtschaftsethik 132 - 134
Master's Thesis | Master's Thesis 556
[WZ2754] Master's Thesis | Master's Thesis 556 - 558
Material and Waste Management | Material and Waste Management 355
[WZ4206] Material Flow Management and Applications | Material Flow Management and Applications 355 - 356
[WZ4206] Material Flow Management and Applications | Material Flow Management and Applications 471 - 472
[WZ1550] Mathematics for Economics | Mathematics for Economics 135 - 136
[WZ2713] Methods of Scientific Communication | Methods of Scientific Communication 25 - 26
[WI001164] Modeling and Optimization in Energy Markets | Modeling and Optimization in Energy Markets 466 - 468
[MCTS0036] Moderation (RESET) | Moderation (RESET) 130 - 131
[MCTS0036] Moderation (RESET) | Moderation (RESET) 243 - 244
[WZ2722] Mountain Catchments under Changing Climate | Mountain Catchments under Changing Climate 374 - 375
[WZ2722] Mountain Catchments under Changing Climate | Mountain Catchments under Changing Climate 469 - 470

N

[WZ1821] Natural Resources - Traits, Management and Theory of Sustainability | Natural Resources - Traits, Management and Theory of Sustainability 14 - 15
[WI001215] Network and stakeholder analysis: Sustainable resource use and agri-food system | Network and stakeholder analysis: Sustainable resource use and agri-food system 478 - 480
[SZ1701] Norwegian A1 | Norwegisch A1 141 - 142
[SZ1703] Norwegian B1 | Norwegisch B1 143 - 144

P

[CLA21023] Passing Exams in Relaxed Mode | Entspannt Prüfungen bestehen 289 - 290
[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 486 - 488
[CLA21115] Philosophy of Human-Machine Interaction | Philosophie der Mensch-Maschine-Beziehung 239 - 240
[CLA20210] Philosophy of Technology | Technikphilosophie 204 - 205
[ED0151] Philosophy of Technology (Advanced Topics) | Technikphilosophie (vertieft) 206 - 207
[WZ2405] Phylogeny and Zoology of Vertebrates | Phylogenie und Zoologie der Vertebraten 160 - 161
[BGU38033] Planning the Urban Water-Energy-Food Nexus | Urban Water-Energy-Food Nexus Planung 533 - 534
[WZ4082] Plantation Forestry and Agroforestry | Plantation Forestry and Agroforestry 327 - 329
[WZ4082] Plantation Forestry and Agroforestry | Plantation Forestry and Agroforestry 489 - 491
[WI000336] Policy of Landscape Development | Politik der Landschaftsentwicklung 156 - 157
[WZ4202] Political and Social Perspectives of Renewable Resources | Political and Social Perspectives of Renewable Resources 353 - 354
[WZ4202] Political and Social Perspectives of Renewable Resources | Political and Social Perspectives of Renewable Resources 494 - 495
[SZ0801] Portuguese A1 | Portugiesisch A1 147 - 149
[SZ0806] Portuguese A2.1 | Portugiesisch A2.1 226 - 228
[SZ0809] Portuguese B1.1 | Portugiesisch B1.1 153 - 155
[SZ0808] Portuguese B1.2 | Portugiesisch B1.2 150 - 152
[CLA10716] Positions of Modern Design | Positionen des modernen Designs 255 - 256
[WZ2398] Practical Ecotoxicology | Praktische Ökotoxikologie 158 - 159
[CLA11301] Presentation Training with Video Feedback | Präsentationstraining vor der Kamera 261 - 262
[EI74831] Project Lab Renewable and Sustainable Energy Systems | Project Lab Renewable and Sustainable Energy Systems [PropENS] 483 - 485
[WZ4197] Protected Areas Biodiversity and Management | Protected Areas Biodiversity and Management 330 - 331
[WZ4197] Protected Areas Biodiversity and Management | Protected Areas Biodiversity and Management 492 - 493

R

[WZ1647] Remediation of Contaminated Sites - Lecture and Exercises | Altlastensanierung - Vorlesung und Übungen 31 - 33
[LS10007] Remediation of Contaminated Sites – Lecture and Seminar | Remediation of Contaminated Sites – Lecture and Seminar 501 - 502
[WZ2737] Remote Sensing and Image Processing | Remote Sensing and Image Processing 343 - 345
[WZ2737] Remote Sensing and Image Processing | Remote Sensing and Image Processing 511 - 513
[LS10003] Remote Sensing of Agriculture and Vegetation | Remote Sensing of Agriculture and Vegetation 496 - 497
[WZ2720] Renewable Energy Technologies | Renewable Energy Technologies 346 - 347
[WZ2720] Renewable Energy Technologies | Renewable Energy Technologies 509 - 510
Renewable Resources | Renewable Resources 346
Required Modules | Pflichtmodule 14
Requirement Proof of Proficiency in German | Nachweis Deutschkenntnisse 559
[WZ1674] Research Methods and Economic Research Project | Research Methods and Economic Research Project 506 - 508
[LS10004] Research Project 'Smart Agriculture' | Research Project 'Smart Agriculture' 498 - 500
[LS20016] Rhizosphere Research | Rhizosphere Research 503 - 505

S

[CIT3640001] Sanitätsausbildung | Sanitätsausbildung 167 - 168
[BV400016] Scientific Paper Writing | Selbständig wissenschaftlich Arbeiten 165 - 166
[CLA90142] Self-Competence - Intensive Course | Selbstkompetenz - intensiv 303 - 305
[CLA20552] Self-Written, Newly Read - A Literary Writers' Lab | Selbst geschrieben, neu gelesen - Eine literarische Schreibwerkstatt 275 - 276
[MCTS9001] Social Studies of Data Science & Engineering | Social Studies of Data Science & Engineering 169 - 171
[LS20023] Soil and Plant Hydrology | Soil and Plant Hydrology 514 - 515
[WZ2734] Soil Protection | Soil Protection 382 - 383
[WZ2734] Soil Protection | Soil Protection 526 - 527
[SZ1201] Spanish A1 | Spanisch A1 179 - 180
[SZ1207] Spanish A1 + A2.1 | Spanisch A1 + A2.1 229 - 231
[SZ1202] Spanish A2.1 | Spanisch A2.1 181 - 183
[SZ12031] Spanish A2.1 + A2.2 | Spanisch A2.1 + A2.2 187 - 188
[SZ1203] Spanish A2.2 | Spanisch A2.2 184 - 186

[SZ1218] Spanish B1.1 | Spanisch B1.1 196 - 197
[SZ1225] Spanish B1.1 + B1.2 | Spanisch B1.1 + B1.2 200 - 201
[SZ1216] Spanish B1.2 | Spanisch B1.2 191 - 192
[SZ1219] Spanish B2.1 | Spanisch B2.1 198 - 199
[SZ1217] Spanish B2.2 | Spanisch B2.2 193 - 195
[SZ1209] Spanish C1 - current issues in Spain and Latin America | Spanisch C1 - La actualidad en España y América Latina 232 - 234
[SZ1212] Spanish C1 - Spain and Latin America - Yesterday and Today | Spanisch C1 - España y América Latina ayer y hoy 189 - 190
[SG8000160] Sponsorship-linked Marketing (Online-course) | Sponsorship-linked Marketing (Online-Kurs) 172 - 174
[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 519 - 521
[CLA21411] Stress Competence | Stresskompetenz [EDS-M4] 293 - 294
[WZ2727] Sustainability of Food Chains | Sustainability of Food Chains 368 - 369
[WZ2727] Sustainability of Food Chains | Sustainability of Food Chains 522 - 523
[WZ2936] Sustainable and Environmental Regulations | Sustainable and Environmental Regulations 316 - 318
[WZ2936] Sustainable and Environmental Regulations | Sustainable and Environmental Regulations 528 - 530
[WI001165] Sustainable Entrepreneurship - Getting Started | Sustainable Entrepreneurship - Getting Started 516 - 518
[WZ1676] Sustainable Land Use and Nutrition | Sustainable Land Use and Nutrition 202 - 203
[WZ2728] Sustainable Land-Use Management | Sustainable Land-Use Management 370 - 371
[WZ2728] Sustainable Land-Use Management | Sustainable Land-Use Management 524 - 525
[ED160017] Sustainable Manufacturing | Nachhaltige Produktion [SuM] 357 - 359
[ED160017] Sustainable Manufacturing | Nachhaltige Produktion [SuM] 475 - 477
[SZ1001] Swedish A1 | Schwedisch A1 175 - 176
[SZ1002] Swedish A2 | Schwedisch A2 177 - 178
[WZ1824] System Analysis and Introduction to Ecology | System Analysis and Introduction to Ecology 22 - 24

T

[CLA10412] Technical Writing (Engineer Your Text!) | Technical Writing (Engineer Your Text!) 247 - 248

[WZ2760] The Great Transformation - Approaches to and Examples of Transformational Change in Business & Society | The Great Transformation - Approaches to and Examples of Transformational Change in Business & Society 216 - 218
[CLA20121] The Sustainability Approach | Leitbild Nachhaltigkeit 267 - 268
[CLA20704] Thinking, Perceiving, and Knowing | Denken, Erkennen und Wissen 277 - 278
[CLA30704] Thinking, Perceiving, and Knowing | Denken, Erkennen und Wissen 299 - 300
[MW2245] Think. Make. Start. | Think. Make. Start. [TMS] 208 - 211
[BGU70005] Transportation Economics | Transportökonomie [Transportation Economics] 531 - 532
[SZ1404] Turkish A1.1 | Türkisch A1.1 214 - 215
[SZ1402] Turkish A2.1 | Türkisch A2.1 212 - 213

U

[CLA11207] Understanding Art 1: Art Reception infront of Originals in Museums in Munich | Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen 222 - 223
[CLA11207] Understanding Art 1: Art Reception infront of Originals in Museums in Munich | Kunst verstehen 1: Kunstrezeption vor Originalen in Münchner Museen 259 - 260
[WZ1344] Urban Agriculture | Urban Agriculture 538 - 540
[WZ0528] Urban Forestry | Urban Forestry 219 - 221
[WZ0528] Urban Forestry | Urban Forestry 535 - 537
[BV210013] Urban und Regional Planning | Stadt- und Regionalplanung 162 - 164
[WZ2723] Utilization and Treatment of Special Materials and Waste | Utilization and Treatment of Special Materials and Waste 360 - 361
[WZ2723] Utilization and Treatment of Special Materials and Waste | Utilization and Treatment of Special Materials and Waste 541 - 542

V

[LS10006] Vertical Farming (MSc.) | Vertical Farming (MSc.) 543 - 544

W

[WZ6432] Wildlife and Conservation Biology | Wildlife and Conservation Biology 334 - 335
[WZ6432] Wildlife and Conservation Biology | Wildlife and Conservation Biology 552 - 553
Wildlife and Protected Area Management | Wildlife and Protected Area Management 330
[WZ4198] Wildlife Management and Wildlife-Human Interactions | Wildlife Management and Wildlife-Human Interactions 332 - 333
[WZ4198] Wildlife Management and Wildlife-Human Interactions | Wildlife Management and Wildlife-Human Interactions 550 - 551
[WZ2735] World Soil Resources | World Soil Resources 384 - 385
[WZ2735] World Soil Resources | World Soil Resources 548 - 549
[CLA10029] Writer's Lab | Writer's Lab 245 - 246