

**Statutes  
about the suitability determination  
for the bachelor's degree program in Molecular Biotechnology  
at the Technical University of Munich**

**From 20 May 2021**

Based on Art. 13 Para. 1 Sentence 2 in conjunction with Art. 44 Para. 4 Sentence 7 of the Bavarian University Act (BayHSchG) and § 34 of the Qualification Ordinance (QualV) (BayRS 2210-1-1-3-K/WK), the Technical University of Munich issues the following statute:

**§ 1**

**Purpose of the determination**

- (1) Admission to the bachelor's degree program in Molecular Biotechnology at the Technical University of Munich in the first or a higher semester requires a special qualification. The bachelor's degree program in Molecular Biotechnology has a special program profile, which is described in Annex 1. In addition to the prerequisites listed in the Fachprüfungs- und Studienordnung (FPSO) in the current version, proof of suitability must be provided in accordance with the following regulations.
- (2) The purpose of the procedure is to determine whether, in addition to the qualification demonstrated by the acquisition of the university entrance qualification, the aptitude for the special qualitative requirements of the bachelor's degree program in Molecular Biotechnology is present. For this study program, the following study program-specific competencies (aptitude requirements) must be fulfilled in addition to the university entrance qualification (HZB):
  1. High understanding of facts from biology, chemistry and physics as well as the necessary mathematical principles;
  2. the ability to link biological with chemical, physical and/or mathematical issues, especially with regard to biotechnological and biochemical issues and their practical applications, and thus to have many aspects at hand at the same time and to be able to combine them in a new way;
  3. Experimental skills and practical inclinations (handling laboratory instruments, microscopes and computers) combined with critical questioning of results;
  4. Strong spatial imagination and observation skills (e.g., of biomolecules or cellular structures);
  5. An above average aptitude for analytical, deductive and interdisciplinary thinking in the above science subjects.

**§ 2**

**Procedure**

- (1) The procedure for determining eligibility is conducted semi-annually once in the summer semester for the following winter semester and in the winter semester, but only for applications for higher semesters, for the following summer semester.

- (2) Applications for admission to the assessment procedure for the respective following winter semester must be submitted to the Technische Universität München in the online application procedure by July 15 and for the summer semester by January 15 (cut-off deadlines).
- (3) Applications and determination of eligibility are in German.
- (4) The application must be accompanied by:
  1. Tabular resume;
  2. Documents required in accordance with § 7 Para. 3 of the statutes of the Technical University of Munich concerning enrollment, re-registration, leave of absence and exmatriculation (ImmatS), as amended;
  3. HZB details;
  4. Justification of a maximum of two pages for the choice of the study program Molecular Biotechnology at the Technical University of Munich, in which the applicants explain on the basis of which abilities, talents and interests they consider themselves particularly suitable for the intended study program; the general personal career can also contribute to this, e.g. extracurricular involvement;
  4. If available, proof of vocational training specific to the study program or other practical work experience as well as proof of extracurricular qualifications relevant to the study program or additional qualifications (e.g. participation in a research competition, voluntary internships relevant to the study program);
  6. assurance that the justification for the choice of the course of study was prepared independently and without outside help and that the thoughts taken from outside sources are marked as such.

### **§ 3 Commission**

The suitability assessment is carried out by a commission appointed by the dean. The size of the commission depends on the number of applicants and consists of more than half university lecturers within the meaning of Art. 2 Para. 3 Sentence 1 BayHSchPG, and the remainder of academic staff. One or more students nominated by the student council shall act in an advisory capacity on the commission. The commission is chaired by the dean or the study program director appointed by him or her. In all other respects, the procedural rules from Art. 41 BayHSchG apply. The commission members are appointed for two years; extension is possible. If, according to these statutes, the commission is active, the revocable transfer of certain tasks to individual commission members is permissible. If, pursuant to sentence 7, only one member of the commission is active in the performance of certain tasks, this member must be a university lecturer. If, pursuant to sentence 7, two or more members of the commission are active in the performance of certain tasks, at least half of them must be university professors. The commission shall ensure an appropriate allocation of responsibilities.

### **§ 4 Admission requirement**

Admission to the assessment procedure requires that the documents specified in § 2 Para. 4 have been submitted to the Technical University of Munich in due form and time and in their entirety. If this is not the case, admission to the assessment procedure will not be granted.

## § 5 Implementation: First stage

- (1) In the first stage of the suitability determination procedure, an evaluation is carried out from the following criteria
1. Average grade of the HZB and
  2. subject-specific individual grades  
The grades listed in the HZB in the subjects mathematics (double), the best continued science (double) and other sciences (single) acquired in the last four semesters before acquiring the HZB, including, if applicable, Abitur grades in these subjects listed in the HZB. If no half-year grades are shown, the average grades shown in the HZB are used accordingly. These are added together and divided by the (weighted) number of individual grades; the grades for the subject-specific thesis or a comparable achievement are not taken into account. If no grade is shown for a named subject in the HZB, the divisor shall be reduced by the corresponding number. If no grades are available for the last four half-years in the subjects mathematics and at least one other natural science, the basic understanding in these areas must be demonstrated in this case in accordance with Paragraph 3 No. 1 Sentence 2 and Sentence 3 by participation in the second stage;
  3. a relevant completed vocational training (biological-technical assistant, chemical-technical assistant, pharmaceutical-technical assistant, medical-technical assistant) as well as extracurricular qualifications or additional qualifications relevant to the study program  
A maximum of one relevant vocational training or apprenticeship, an internship of at least four weeks, successful participation in the studium MINT (orientation semester at TUM) and successful participation in the competitions "Jugend forscht" or "Mathematik-Olympiade" (at least award at the state level) will be considered as extracurricular qualifications or additional qualifications relevant to the course of study for each applicant. The qualifications must be verifiable by the applicant and corresponding documents must be attached to the application in accordance with § 2 Para. 4. The Commission shall decide on the recognition of the stated extracurricular qualifications or additional qualifications.
- (2) The following applies to the conduct of the evaluation:
1. The average grade of the HZB is converted into points (HZB points) on a scale from 0 to 100, where 0 is the worst conceivable grade and 100 is the best possible grade. The scale is to be chosen in such a way that an HZB that has just been passed is assessed with 40 points (for conversion formula, see Appendix 2). Whoever claims that he/she was prevented from achieving a better average grade in the HZB for reasons for which he/she is not responsible, will, upon application, be involved in the procedure with the average grade as evidenced by school reports.
  2. The result of the evaluation of the subject-specific individual grades according to Para. 1 No. 2 is converted into points on a scale of 0 to 100 according to No. 1 (for conversion formula, see Appendix 2). If this value is not a whole number, it is rounded up to the next whole number in favor of the applicant.
  3. Each relevant extracurricular qualification or additional qualification recognized by the Commission pursuant to Para. 1 No. 3 shall be evaluated in accordance with Annex 2 No. 4. The applicant can achieve a maximum of 10 points from the area of extracurricular qualifications or additional qualifications.
  4. The total evaluation of the first stage is the sum of the HZB points multiplied by 0.5 (see No. 1), the points from No. 2 multiplied by 0.5 and the additional points from No. 3. If this value is not a whole number, it is rounded up to the next whole number in favor of the applicant. A maximum of 100 points can only be achieved.
  5. Departing from No. 1 and No. 2, in the case of graduates of the master craftsman's examination and of further vocational training examinations equated to the master

craftsman's examination by the Ministry of State, the criterion according to No. 1 shall be replaced by the criterion of the arithmetic mean of the individual grades of the respective examination parts and the criterion according to No. 2 shall be replaced by the criterion of the specified subject-specific individual grades in the subjects mathematics and at least one natural science of this examination. In the case of graduates of technical colleges and technical academies, in deviation from No. 1 and No. 2, the criterion according to No. 1 shall be replaced by the criterion of the overall examination grade or, if no overall examination grade is shown, by the criterion of the arithmetic mean of the individual grades of the subjects (excluding elective subjects) of the final certificate and the criterion according to No. 2 shall be replaced by the criterion of the subject-specific individual grades in the subjects mathematics and other natural sciences in the final certificate. If no grade is shown for a named subject, the divisor is to be reduced by the corresponding number. In this case, the basic understanding in the subjects named in § 1 is to be demonstrated by participation in the second stage in accordance with § 5 para. 3 no. 1 sentence 2 and sentence 3.

- (3) Result of the first stage of the suitability determination
1. Whoever achieves 88 points or more in the first stage is admitted. This does not apply if the continued subject-specific individual grades in the subjects mathematics and other sciences were not shown in the HZB. Even if the score is achieved, the subject-specific aptitude must be proven by passing the second stage of the procedure.
  2. If the score calculated in accordance with Para. 2 is 69 points or less, applicants shall be deemed unsuitable. This also applies if applicants lack individual subject-specific grades.
- (4) The remaining applicants shall proceed to the second stage of the aptitude testing procedure. In the second stage of the aptitude testing procedure, an invitation to a selection interview shall be issued. The date of the selection interview shall be announced by the commission at least one week in advance.
- (5) In deviation from paras. 1 to 3, applicants who were enrolled in the same or a related degree program and who are not to be admitted directly according to the criteria for the first stage shall participate in the second stage of the aptitude assessment procedure, provided they can prove at least 20 credits per semester already completed.
- (6) Departing from paras. 1 to 3, those applicants who submit a hardship application shall also be admitted to the second stage as an exception. All documents must be enclosed with the application. The applicant must prove that he or she has such serious health, social or family reasons that, applying particularly strict standards, it would not be proportionate for the applicant to be rejected in the first stage.

## § 6

### Implementation: Second stage

- (1) In the second stage of the aptitude testing procedure, the average grade of the HZB and the result of the selection interview are evaluated, whereby the average grade of the HZB is to be considered at least equally.
- (2) The selection interview is not public. It shall be conducted as an individual interview with two members of the commission, one of whom must be a university lecturer within the meaning of Art. 2 Para. 3 Sentence 1 BayHSchPG. With the consent of the applicant, a member of the student group may be admitted to the audience. The duration of the interview shall be at least 20 minutes and shall not exceed 25 minutes. It is to be determined whether the applicant can be expected to achieve the goal of the study program on a scientific basis independently and responsibly. In the interview, no special prior knowledge beyond the level of a general high

school education will be tested, unless an application according to § 5 para. 5 has been submitted. The subject of the interview may also be the documents submitted in accordance with § 2 par. 3. The date set for the interview shall be observed by the applicant. The interviews may also be held by video conference if the Commission so decides. If the request is justified and approved by the Commission, a selection interview by videoconference is possible. The applicant bears the risk in the event of any technical problems, unless these are the responsibility of the Technische Universität München. The content of the interview covers the following topics:

1. presentation of the professional ideas and realistic expectations of the study program, also taking into account the reasons for the choice of the study program attached to the application; the applicant has dealt with the goals and contents of the study program and can justify the choice of the study program Molecular Biotechnology as well as formulate ideas about possible professional fields,
2. the candidate is able to apply basic mathematical knowledge as well as scientific knowledge from the continued natural sciences of the HZB to contexts and issues of molecular biotechnology and to analyze presented problems in an appropriate time, e.g. the application and correlation of school material with regard to the recognition of physical limitations in chemical and biological processes or the mathematical comprehension of chemical and biological processes,
3. the candidate has an insight into recent scientific approaches and problems discussed in society and politics in the context of molecular biotechnology and can also describe them, based on the school material.

The individual topics will be weighted as follows in determining the selection interview score:

1. maximum 20 points (20 %)
2. maximum 50 points (50 %)
3. maximum 30 points (30 %)

On the basis of the weighting regulated in sentence 12, each participating commission member evaluates the topics of the selection interview. The overall evaluation of the selection interview results from the arithmetic mean of the individual evaluations by the participating commission members, rounded up to the next largest whole number if necessary.

- (3) The total score of the second stage is the sum of the HZB points multiplied by 0.5 (see § 5 para. 2 no. 1) and the points of the selection interview multiplied by 0.5 (see para. 2). If this value is not an integer, it will be rounded up to the next highest number in favor of the applicant.
- (4) If the total score formed according to paragraph 3 is 79 or higher, the suitability is determined on the basis of the result of the second stage of the suitability determination procedure.
- (5) Applicants or candidates with an overall score of 78 or less are unsuitable for the program.

## **§ 7 Notices**

The result of the suitability assessment procedure shall be communicated by notice. If there is no leeway in the assessment of the individual criteria or in the determination of the overall results of the first and second stages, the Commission need not pass a resolution. Refusal notices shall state the reasons and be accompanied by instructions on how to appeal.

## **§ 8 Documentation**

The course of the suitability determination procedure must be documented, in particular the assessment of the selection interview by the commission members and the overall result must be evident from this. A record must be made of the selection interview, showing the date, duration and location of the assessment, the names of the commission members involved, the names of the applicants, and the main topics of the interview.

## **§ 9 Repeat**

Whoever has not provided proof of suitability for the intended course of study may re-register once for the suitability assessment procedure. A further repetition is not possible. In justified exceptional cases (written proof of e.g. illness), registration for a further date is possible.

## **§ 10 Entry into force**

These statutes shall enter into force with effect from May 15, 2021. It shall apply from the winter semester 2021/2022 onwards. At the same time, the statute on the aptitude assessment for the bachelor's degree program in Molecular Biotechnology at the Technical University of Munich dated April 1, 2010, last amended by No. 8 of the collective amendment statute on the number of examining committee members in the aptitude assessment procedure for bachelor's degree programs at the Technical University of Munich dated July 30, 2020, shall cease to apply.

## Attachment 1

### Justification

Molecular biotechnology encompasses an extraordinary range of concepts and goals. These range from basic scientific research into biomolecules and their targeted functional optimization to their production on a laboratory scale or their large-scale production with the quality standards of the biopharmaceutical industry. In addition, molecular biotechnology encompasses the research and implementation of concepts of molecular medicine. Molecular biotechnology thus stands at the interface of various scientific disciplines, engineering knowledge and biomedical principles!

In this respect, the special qualitative requirements for applicants to this bachelor's program include a profound understanding of biology, chemistry and physics, as well as the necessary mathematical principles, an interest in molecular medicine, and the motivation to deal in depth with technical solution possibilities from laboratory scale to industrial implementation. In particular, we expect our students to grasp the multi-scale nature of molecular biotechnology and see it as a motivating challenge for their studies. We also expect them to have a special interest in applied goals of this science, as well as the ability to acquire the technical skills essential to achieve these goals. They should also not be completely unfamiliar with the economic aspects of this science.

These special qualitative requirements for a successful bachelor's program in Molecular Biotechnology at the Technical University of Munich from the very first semester require a targeted examination of scientific and mathematical prerequisites, which cannot be explicitly demonstrated by the university entrance qualification alone. Rather, both scientific aptitude and the ability to make interdisciplinary connections must be tested individually. Furthermore, it is essential to check whether they are able to overview the connections between (i) current problem situations (such as pandemics, raw material shortages, agricultural production), (ii) the bioscientific foundations for researching these problems, and (iii) the technical possibilities for developing goal-oriented approaches to solving them. A conversation to discuss these interrelationships has proven to be very effective!

## Enclosure 2

### Conversion formulas

The conversion of different grading scales into points on a scale from 0 to 100 is done according to the regulations 1. to 3. 100 points correspond to the best possible evaluation and 40 points to a performance just rated as passed in the respective initial grading system.

#### 1. German grading system

with 1 as best and 6 as worst grade

$$\text{Points} = 120 - 20 * \text{Grade.}$$

Grades 1, 2, ..., 5 and 6 consequently correspond to 100, 80, ..., 20 and 0 points. Grade 4 corresponds to 40 points.

Since HZB grades are given to one decimal place in German certificates, no rounding to whole numbers is required when applying the formula of No. 1.

#### 2. German point system (e.g. Kollegstufe)

with 15 as best and 0 as worst point value

$$\text{Points} = 10 + 6 * \text{Point value.}$$

#### 3. any numeric staff system

with grade N, where Nopt is the best score and grade Nbest is just enough to pass.

$$\text{Points} = 100 - 60 * (\text{Nopt} - N) / (\text{Nopt} - \text{Nbest}).$$

If the score calculated according to the given formula is not an integer, it will be rounded up to the next highest integer in favor of the applicant.

Example: In the Bulgarian grading system, Nopt = 6, Nbest = 3 and 1 is the worst possible grade. The given formula simplifies to: Points = 100 - 20 \* (6 - N).

#### 4. Additional points for extracurricular qualifications or additional qualifications relevant to the course of study.

Points are awarded for the extracurricular qualifications and additional qualifications shown in the overview, which can be added together. A maximum of 10 points can be included in the calculation. The commission decides on the recognition of the specified qualifications

Type of qualification	Duration				
	Full-time (35 hrs/week or more)			Part-time	
	1-5 months	6-12Months	> 1 year	> 1 year	> 3 years
Training	0	3	6	3	6
Internship	1	2	3	2	3
Study MINT at the TUM	2				
Competition pursuant to Section 5 (1) No. 3 Sentence 1	2				

Issued on the basis of the resolution of the Academic Senate of the Technical University of Munich dated March 24, 2021 and the approval by the President of the Technical University of Munich dated May 20, 2021.

Munich, May 20, 2021

Munich University of Technology

Thomas F. Hofmann



President

These bylaws were filed at the college on May 20, 2021; notice of the filing was posted at the college on May 20, 2021. The date of announcement is therefore May 20, 2021.

Only the German version is legally binding