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## **Academic and Examination Regulations for the Master's Degree Program in Technology of Biogenic Resources at the Technical University of Munich**

**Dated 18 May 2020**

In accordance with Art. 13(1) Sentence 2 in conjunction with Art. 58(1) Sentence 1, Art. 61(2) Sentence 1 and Art. 43(5) of the Bavarian Higher Education Act [*Bayerisches Hochschulgesetz (BayHSchG)*] the Technical University of Munich issues the following Regulations:

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### **§ 34 Applicability, Academic Titles**

- (1) <sup>1</sup>The Examination and Academic Regulations for the Master's Program in Technology of Biogenic Resources (FPSO) complement the General Academic and Examination Regulations for Bachelor's and Master's programs at the Technical University of Munich (APSO) dated 18 March 2011 as amended. <sup>2</sup>The APSO has precedence.
- (2) <sup>1</sup>Upon successful completion of the master's examination, the degree "Master of Science" ("M.Sc.") is awarded. <sup>2</sup>The academic title may also be used with the name of the university ("TUM").

### **§ 35 Commencement of Studies, Standard Duration of Study, ECTS**

- (1) Admission to the Master's Program in Technology of Biogenic Resources at the Technical University of Munich is possible both in the winter and in the summer semester.
- (2) <sup>1</sup>90 credits in required and elective subjects are needed to obtain the master's degree (70 weekly hours per semester) spread over three semesters. <sup>2</sup>In addition, 30 credits are given for completion of the master's thesis (in a maximum of six months), in accordance with § 46. <sup>3</sup>The number of coursework units and examinations in elective subjects to be completed in the Master's Program in Technology of Biogenic Resources according to Appendix 1 is a minimum of 120 credits. <sup>4</sup>The standard duration of study for the master's program will be a total of four semesters.

### **§ 36 Eligibility Requirements**

- (1) Eligibility for the Master's Program in Technology of Biogenic Resources is demonstrated by
  1. a qualified bachelor's degree obtained after a program of at least six semesters from a domestic or foreign institution of higher education, or an at least equivalent degree in Technology of Biogenic Resources, Energy Technology, Process Engineering, Bio- and Chemical Engineering, Bioprocess Engineering, Environmental Technology or a comparable degree program,
  2. adequate knowledge of the English language; students whose language of instruction is not English must demonstrate proficiency through an acknowledged language test such as the Test of English as a Foreign Language (TOEFL) (with a minimum of 88 points), the International English Language Testing System (IELTS) (with a minimum of 6.5 points), or the Cambridge Main Suite of English Examinations; if, in the undergraduate program, 15 credits were obtained for examinations administered in English-language examination modules, adequate proficiency in English is deemed proven.
  3. passing the Aptitude Assessment in accordance with Appendix 2.
- (2) A degree is considered a qualified degree within the meaning of Subsection 1 if there are no significant differences with regard to the competencies (learning outcomes) acquired in the scholarly oriented bachelor's programs or in comparable degrees specified in Subsection 1, No. 1, and if these outcomes correspond to the subject-specific requirements of the master's degree program.

- (3) <sup>1</sup>The required modules of the bachelor's degree program in Technology of Biogenic Resources are used as benchmarks for the determination in accordance with Subsection 2. <sup>2</sup>If examination requirements are determined to be missing, the Aptitude Assessment Commission can require, in accordance with Appendix 2 No. 3, that these examinations are to be completed as additional fundamentals exams as specified in Appendix 2 No. 5.1.3 to demonstrate the qualification defined in Subsection 1. <sup>3</sup>The applicants to university are to be informed of this after the review of their application documents in the first stage of the aptitude assessment.
- (4) The comparability of programs, subject-specific aptitude, as well as the equivalence of degrees acquired at foreign institutions of higher education will be decided upon by the Aptitude Assessment Commission in compliance with Art. 63 of the Bavarian Higher Education Act [*BayHSchG*].
- (5) <sup>1</sup>In deviation from Subsection 1 No. 1, students enrolled in a bachelor's degree program mentioned in Subsection 1 No. 1 may be admitted to the master's degree program upon the student's well-founded request. <sup>2</sup>Students may apply only if they have completed module examinations covering at least 140 credits in a six-semester bachelor's degree program, at least 170 credits in a seven-semester bachelor's degree program, or at least 200 credits in an eight-semester bachelor's degree program at the time of application. <sup>3</sup>Students must provide proof of completion of their bachelor's degree within one year of beginning the master's degree program.

### **§ 37**

#### **Modular Structure, Module Examination, Courses, Areas of Specialization, Language of Instruction**

- (1) <sup>1</sup>General provisions concerning modules and courses are set forth in §§ 6 and 8 of the APSO. <sup>2</sup>For any changes to the stipulated module provisions § 12(8) of the APSO shall apply.
- (2) The curriculum listing the required and elective modules is included in Appendix 1.
- (3) <sup>1</sup>As a rule, the language of instruction in the master's degree program in Technology of Biogenic Resources is English. <sup>2</sup>Individual modules taught entirely or partly in German are designated as such in Appendix 1. <sup>3</sup>Students who have not verified their knowledge of German in the application process will be conditionally admitted with the stipulation that they complete at least one module in which they acquire integrative knowledge of German by the end of the second semester of enrollment in the degree program. <sup>4</sup>The offer will be announced by the Examination Board accordingly. <sup>5</sup>Optional achievements completed in extracurricular courses, e.g. German courses offered by the TUM Language Center, will also be recognized.

### **§ 38**

#### **Examination Deadlines, Academic Progress Checks, Failure to Meet Deadlines**

Examination deadlines, academic progress checks, and failure to meet deadlines are governed by § 10 of the APSO.

## § 39 Examination Board

In accordance with § 29 of the APSO, the board responsible for decisions concerning examination matters is the Master's Examination Board at the TUM Campus Straubing for Biotechnology and Sustainability.

## § 40 Recognition of Periods of Study, Coursework and Examination Results

The recognition of periods of study, coursework, and examination results is governed by § 16 of the APSO.

## § 41 Continuous Assessment Procedure, Types of Assessment

- (1) In addition to written examinations (*Klausuren*) and oral examinations, types of assessment in accordance with § 12 and § 13 of the APSO in this degree program may include (but are not limited to) laboratory assignments, practical credit requirements (tests, where applicable), reports, project work, presentations, learning portfolios, and research papers.
- a) <sup>1</sup>A **Klausur** is a supervised written examination. In these written examinations, students are expected to demonstrate, within a limited amount of time and using predefined methods and resources, their ability to identify problems, find solution strategies and, if required, implement them. <sup>2</sup>The duration of the examination is regulated in § 12(7) of the APSO.
  - b) <sup>1</sup>Depending on the discipline, **laboratory assignments** may include experiments, measurements, field work, field exercises, etc. with the goal of students conducting such work, evaluating results and gaining knowledge. <sup>2</sup>These may consist of, for example, process descriptions and the underlying theoretical principles including studying the relevant literature; preparation and practical implementation; calculations, if required, and documentation, evaluation, and interpretation of the results in the context of the knowledge to be gained. <sup>3</sup>Laboratory assignments may be complemented by presentations designed to demonstrate a student's communication competency in presenting scholarly work to an audience. <sup>4</sup>Details of each laboratory assignment and the competencies to be assessed in each examination are set out in the module descriptions.
  - c) <sup>1</sup>**Practical credit requirements (tests where applicable)** involve students completing assigned tasks (for example, solving mathematical problems, writing computer programs, preparing models) using theoretical knowledge to solve application-oriented problems. <sup>2</sup>Practical credit requirements are designed to assess a student's factual and detailed knowledge and its application. <sup>3</sup>Practical credit requirements may be carried out in writing, orally, or electronically. <sup>4</sup>They may be in the form of homework assignments, practice sheets, programming exercises, (e-)tests, tasks assigned within a university internship program, etc. <sup>5</sup>Details of each practical credit requirement and the competencies to be assessed in each examination are set out in the module descriptions.
  - d) <sup>1</sup>A **report** is a written record and summary of a learning process for the purpose of presenting the acquired knowledge in a structured way and analyzing the results in the context of a module. <sup>2</sup>Students are expected to demonstrate that they have understood all essential aspects and are able to present them in writing. <sup>3</sup>Reports may include excursion reports, internship reports, work reports, etc. <sup>4</sup>The written report may be complemented by a presentation for the purpose of assessing the student's communication competency in presenting scholarly work to an audience.

- e) <sup>1</sup>**Project work** is designed to reach, in several phases (initiation, problem definition, role assignment, idea generation, criteria development, decision, implementation, presentation, written evaluation), the defined objective of a project assignment within a given period of time and using suitable instruments. <sup>2</sup>In addition, project work may include a presentation in order to assess a student's communication competency in presenting scholarly work to an audience. <sup>3</sup>Details of each project work and the competencies to be assessed in each examination are set out in the module descriptions. <sup>4</sup>Project work may also be completed in the form of group work. <sup>5</sup>In group work, students are expected to demonstrate that they can solve problems as a team. <sup>6</sup>Each student's contribution to be assessed as an examination requirement must be clearly and individually recognizable and assessable. <sup>7</sup>This also applies to their individual contributions to the group outcome.
- f) <sup>1</sup>A **research paper** is a written assignment in which students work independently on solving complex scholarly or scholarly/application-oriented problems, using the scientific methods of the relevant discipline. <sup>2</sup>Students are expected to demonstrate that they are able to solve problems corresponding to the learning results of the module in question in compliance with the guidelines for scholarly work – from analysis and conception to implementation. Research papers, differing in their requirement standards, may take the form of a conceptual framework/theory paper [*Thesenpapier*], abstract, essay, term paper, seminar paper, etc. <sup>4</sup>The research paper may be complemented by a presentation and/or a colloquium for the purpose of assessing the student's communication competency in presenting scholarly work to an audience. <sup>5</sup>Details of each research paper and the competencies to be assessed in each examination are set out in the module descriptions.
- g) <sup>1</sup>A **presentation** is a systematic and structured oral performance supported by suitable audio-visual equipment (such as beamer, slides, posters, videos) for the purpose of demonstrating and summarizing specific issues or results and paring complex problems down to their essential core. <sup>2</sup>In 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 an audience. <sup>3</sup>In addition, the student is expected to demonstrate that he or she is able to respond competently to any questions, suggestions or discussions brought by the audience and relating to the subject area. <sup>4</sup>The presentation may be complemented by a brief written précis. <sup>5</sup>The presentation may take the form of an individual or a group achievement. <sup>6</sup>Each student's contribution to be assessed as an examination requirement must be clearly and individually recognizable and assessable. <sup>7</sup>This also applies to their individual contributions to the group outcome.
- h) <sup>1</sup>An **oral examination** is a timed, graded discussion on relevant topics and specific questions to be answered. <sup>2</sup>In oral examinations students are expected to demonstrate that they have achieved the qualification objectives documented in the module descriptions and understood the central concepts of the subject matter covered by the exam and are able to apply them to specific problems. <sup>3</sup>The oral exam may take the form of an individual or a group achievement. <sup>4</sup>The duration of the examination is regulated in § 13(2) of the APSO.
- i) <sup>1</sup>A **learning portfolio** is a collection of completed written work compiled by the student according to predefined criteria that exhibits the student's progress and achievements in defined content areas at a given time. <sup>2</sup>Students are required to explain the reasons for selecting the works included as well as their relevance for their learning progress and for the achievement of the qualification objectives. <sup>3</sup>With the learning portfolio, students are expected to demonstrate that they have taken active responsibility for their learning process and that they have achieved the qualification objectives documented in the module description. <sup>4</sup>Depending on the module description, types of independent study assessment in a learning portfolio may include, in particular, application-oriented assignments, web pages, weblogs, bibliographies, analyses, conceptual framework/theory papers, as well as the graphic representation of facts or problems. <sup>5</sup>Details of each learning portfolio and the competencies to be assessed in each examination are set out in the module descriptions.

- (2) <sup>1</sup>The module examinations will, as a rule, be taken concurrently with the degree program. <sup>2</sup>The type and duration of module examinations is stipulated in Appendix 1. <sup>3</sup>For any changes to the

stipulated module provisions § 12(8) of the APSO shall apply. <sup>4</sup>The assessment of the module examination is governed by § 17 of the APSO. <sup>5</sup>The grade weights of module examination components correspond to the weighting factors assigned to them in Appendix 1.

- (3) If it is specified in Appendix 1 for a module examination that it is a written or oral exam, the examiner informs the students about the required type of examination at the latest on the first day of classes.
- (4) At the request of the students and with the consent of the examiners, examinations for German-language modules may be taken in English.

## **§ 42 Admission to and Registration for the Master's Examination**

- (1) <sup>1</sup>Students who are enrolled in the master's program in Technology of Biogenic Resources are deemed admitted to the module examinations of the master's examination. <sup>2</sup>If students are required to complete fundamentals examinations in accordance with Appendix 2 No. 5.1.3, then they must be informed in writing by the Examination Board for which module examination proof of completing the fundamentals examinations is a requirement for admission to the module examination, in deviation from Sentence 1.
- (2) <sup>1</sup>Registration requirements for required and elective module examinations are stipulated in § 15(1) of the APSO. <sup>2</sup>The registration requirements for repeat examinations for failed required modules are stipulated in § 15(2) of the APSO.

## **§ 43**

### **Scope of the Master's Examination**

- (1) The master's examination consists of:
  - 1. the module examinations in the relevant modules in accordance with Subsection 2;
  - 2. the master's thesis in accordance with § 46.
- (2) <sup>1</sup>The module examinations are listed in Appendix 1. <sup>2</sup>34 credits must be completed in the required modules and at least 56 credits in the elective modules. <sup>3</sup>The selection of modules must comply with § 8(2) of the APSO.

## **§ 44**

### **Repeat Examinations, Failed Examinations**

- (1) The repetition of examinations is governed by § 24 of the APSO.
- (2) Failure of examinations is governed by § 23 of the APSO.

## § 45 Coursework

No pass/fail coursework in addition to examination requirements is required in the Master's Degree Program in Technology of Biogenic Resources.

### § 45 a Multiple Choice Tests

The conduct of multiple choice tests is governed by § 12 a of the APSO.

## § 46 Master's Thesis

- (1) <sup>1</sup>As part of the master's examination, each student must write a master's thesis in accordance with § 18 of the APSO. <sup>2</sup>The thesis topic may be determined and the master's thesis supervised by expert examiners (*Themensteller/Themenstellerin*) of the TUM Campus Straubing for Biotechnology and Sustainability. <sup>3</sup>Expert examiners as stipulated in Sentence 2 are appointed by the Examination Board.
- (2) <sup>1</sup>Completion of the master's thesis module, as a rule, is the final examination requirement. <sup>2</sup>Upon request students may be granted early approval to commence work on the master's thesis if the objective of the thesis in the sense of § 18(2) APSO can be fulfilled under consideration of the progression of studies to date.
- (3) <sup>1</sup>The period of time between topic determination and submission of the completed master's thesis must not exceed 6 months. <sup>2</sup>The master's thesis is considered submitted and failed if the student fails to submit it on time without valid reasons as specified in § 10(7) of the APSO. <sup>3</sup>The master's thesis must be written in English.
- (4) <sup>1</sup>Completion of the master's thesis consists of a written paper and an oral presentation about its subject matter. <sup>2</sup>The oral presentation is not included in the grade.
- (5) <sup>1</sup>If the master's thesis module was not graded as at least "sufficient" (4.0), it may be repeated once with a new topic. <sup>2</sup>Students must renew their application to prepare the master's thesis module within six weeks of receipt of the grade.

## § 47 Passing and Assessment of the Master's Examination

- (1) The master's examination is deemed passed when all examinations required for the master's examination in accordance with § 43(1) have been passed and a plus credits account of at least 120 credits has been achieved.
- (2) <sup>1</sup>The module grade will be determined according to § 17 of the APSO. <sup>2</sup>The overall grade for the master's examination will be calculated as the weighted grade average of the modules according to § 43(2) and the master's thesis. <sup>3</sup>The grade weights of the individual modules correspond to the credits assigned to each module. <sup>4</sup>The overall assessment is expressed by the designation in accordance with § 17 of the APSO.

**§ 48**  
**Degree Certificate, Diploma, Diploma Supplement**

<sup>1</sup>If the master's examination is passed, a degree certificate, a diploma and a diploma supplement including a transcript of records are to be issued in compliance with § 25(1) and § 26 of the APSO.

<sup>2</sup>The date of the graduation certificate is the date on which all examination requirements have been fulfilled and coursework completed.

**§ 49**  
**Entry into Force**

- (1) <sup>1</sup> These regulations enter into force as of 1 April 2020. <sup>2</sup>They apply to all students who commence their studies at the Technical University of Munich as of the winter semester 2020/21.
  
- (2) <sup>1</sup>The Examination Regulations for the Master's degree Program in Renewable Resources at the Technical University of Munich dated 20 August 2015 cease to be in force at the same time. <sup>2</sup>Students who began their studies at the Technical University before the winter semester 2020/21 conclude their studies in accordance with the regulations in Sentence 1.



## APPENDIX 1: Examination Modules

No.	Module title	Type of instruction SWS V Ü P	ZV	Sem.	SWS	Credits	Type of examination	Duration of examination	Weighting	Language of instruction
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### Required modules

CS 0101	Renewables Utilization	V, Ü		1	2V 2Ü	5	written	90		English
CS 0132	Energy process engineering	V, Ü		1	2 V 3Ü	6	written	90		English
CS 0133	Mechanical process engineering	V, Ü		1	2V, 2Ü	6	written	90		English
CS 0134	Conceptual process design	V, Ü		1	2V, 2Ü	6	written/oral	30/30		English
CS 0135	Cooperative Design Project	P		2	5P	5				English
CS 0136	Energetic use of biomass and residuals	V, Ü		2	2V, 2Ü	6	written	60		English
	<b>Total:</b>				26	34 credits				

CS 0144	Master's Thesis					30 credits				English
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**Subject-specific elective modules:** In the subject-specific electives area, students must complete elective modules totaling 50 credits from the following (non-exhaustive) list. The Examination Board updates the catalog of subjects of the elective modules. Changes will be announced on the websites of the Examination Board at the latest at the beginning of the semester.

No.	Module title	Type of instruction SWS V Ü P	ZV	Sem.	SWS	Credits	Type of examination	Duration of examination	Weighting	Language of instruction
CS 0137	CO <sub>2</sub> capture, storage, and utilization	V, Ü		WiSe	1.5V, 1Ü	4	oral	25		English
WZ 1151	Biogenic polymers	V, S		WiSe	2V, 1S	5	oral	30		English
WZ 1154	Biorefinery	V,Ü		WiSe	2V, 1Ü	5	written	60		English
CS 0138	Research lab energy and process engineering	P		WiSe	5P	5	Report			English
WZ 1193	Biogas Technology	V, Ü		SoSe	2.5V, 1Ü	5	written	60		German
WZ 1664	Energy storage	V, Ü		WiSe	2V, 2Ü	5	written	90		English

WZ 1191	Phytopharmaceuticals and natural products	V, Ü		SoSe	2V, 1L	5	written	60		English/German
WZ 1120	Medicinal and spice plants	V, Ü		SoSe	2V, 1Ü	5	written	60		German
CS 0105	Modeling and Optimization of Energy Systems	V		WiSe	4 V	6	written	90		English
CS 0139	Flowsheet balancing and simulation	Ü		WiSe	4Ü	5	Practical credit requireme			English
CS 0003	Production of alternative fuels	V, Ü		WiSe	2V, 2Ü	5	written/oral	30/30		English
CS 0141	Machine Learning	V, Ü		SoSe	2V, 2Ü	5	written	90		English
CS 0142	Detail Process Engineering	V, Ü		SoSe	2V, 2Ü	5	written	90		English
WZ 1152	Polymer Processing	V, Ü		WiSe	2V, 1L	5	oral	60		English
WZ 1173	Bioinspired Materials and Processes	V, Ü		WiSe	2V, 1Ü	5	oral	30		English
WZ 1157	Sustainable Chemistry	V, Ü		SoSe	2V, 1Ü	5	written	60		English
WZ 1180	Energy and Economics	V, Ü		WiSe	3V, 1Ü	5	written	60		German
CS 0092	Wind Power	V, Ü		SoSe	1.5V, 1Ü	4	written	60		English/German
CS 0143	Hydropower	V		SoSe	3 V	4	written	60		German
CS 0100	Microbial and plant biotechnology	V, Ü		WiSe	3V, 1Ü	6	written	135		English
WZ 1128	Geothermal Energy Systems	V		WiSe	4 V	5	written	90		English

**General elective modules:** Students must complete 6 credits as general/interdisciplinary modules. They can obtain the credits in modules offered by other TUM schools and departments or institutions of higher education.

Explanations:

Sem. = semester; SWS = Semesterwochenstunden/weekly hours per semester; V = Vorlesung/lecture; Ü = Übung/exercise; P = Praktikum/internship; ZV = Zulassungsvoraussetzung/admission requirement (see § 43 (1)); WiSe = winter semester; SoSe = summer semester;= written exam

In the column "Duration of examination", the duration of written and oral examinations is specified in minutes.

Examination requirements in the area of Technology of Biogenic Resources completed at a different institution of higher education within the framework of a master's degree program (e.g. during a semester abroad) can be recognized for up to 30 credits and used as electives in the area elective modules in accordance with Appendix 1 for the master's examination even if there is no corresponding module in the module catalog of the Technical University of Munich, but the requirements otherwise correspond to those of the master's degree program in Technology of Biogenic Resources. The Examination Board of the TUM Campus Straubing for Biotechnology and Sustainability makes decisions concerning recognition in consultation with the student advisor for the master's degree program in Technology of Biogenic Resources and the International Affairs Delegate of the Faculty TUM Campus Straubing for Biotechnology and Sustainability.

**Credit total for each semester:**

Semester	Credits Required modules	Credits Elective modules	Credits General elective modules	Credits Master's Thesis	Total Credits	Number of exams
1	23	7	-	-	30	5
2	11	19	-	-	30	6
3	-	24	6		30	6
4	-	-	-	30	30	1

## **APPENDIX 2: Aptitude Assessment**

### **Academic and Examination Regulations for the Master's Program in Technology of Biogenic Resources at the Technical University of Munich**

#### **1. Purpose of the Process**

<sup>1</sup>Eligibility for the Master's Degree Program in Technology of Biogenic Resources, in addition to the requirements pursuant to § 36(1) Nos. 1 and 2, requires proof of aptitude pursuant to § 36(1) No. 3 in accordance with the following provisions. <sup>2</sup>The special qualifications and skills of the candidates should correspond to the field of the technology biogenic raw materials. <sup>3</sup>The individual aptitude parameters are:

- 1.1 ability to do research work and/or basic research and methodological work;
- 1.2 specialist knowledge in the field of Energy Technology from a bachelor's degree program comparable to the bachelor's degree program in Technology of Biogenic Resources at the Technical University of Munich,
- 1.3 specialist knowledge in the field of Process Engineering from a bachelor's degree program comparable to the bachelor's degree program in Technology of Biogenic Resources at the Technical University of Munich.

#### **2. Aptitude Assessment Process**

2.1 The Aptitude Assessment Process is conducted semi-annually by the TUM Campus Straubing for Biotechnology and Sustainability.

2.2 <sup>1</sup>Applications for admission to the aptitude assessment process for the winter semester must be submitted to the Technical University of Munich together with the documents listed in 2.3.1 through 2.3.5 no later than 31 May (and for the summer semester by 15 January) (absolute deadlines) using the online application process. <sup>2</sup>The student's diploma and graduation certificate, serving as proof of the conferral of the bachelor's degree, must be submitted to the Admissions and Enrollment Office of the Technical University of Munich no later than five weeks after the first day of classes. <sup>3</sup>Admission to the master's program is, otherwise, not possible in accordance with § 36 of these regulations.

2.3 The application must include:

2.3.1 <sup>1</sup>a transcript of records containing modules amounting to at least of 140 credits; the transcript of records must be issued by the relevant examination authority or academic programs office. <sup>2</sup>The Transcript of Records is to be entered into the Excel table issued by the TUM Campus Straubing for Biotechnology and Sustainability.

2.3.2 curriculum vitae formatted as a table;

2.3.3 the curriculum on which the bachelor's degree program was based and which indicates the contents of the modules and the competencies gained (e.g., module catalog, module descriptions), as well as the form made available by the TUM Campus Straubing for Biotechnology and Sustainability in which applicants compile their grade, credits, and weekly hours per semester for their examinations in the fundamental areas of Mathematics, Informatics, Chemistry, Biology, Technical Mechanics, Materials Science, Thermodynamics, Energy Technology, Electrical Engineering, Thermal Separation Principles and Reaction Engineering.

- 2.3.4 a written essay, in English, of at most one A4 page giving the reasons for selecting the degree program in Technology of Biogenic Resources at the Technical University of Munich in which the applicants explain on the basis of which specific talents and interests they consider themselves particularly suitable for the master's degree program in Technology of Biogenic Resources at the Technical University of Munich; the applicant's exceptional motivation is to be demonstrated, for example by providing details on program-related vocational training, internships, stays abroad, or program-related further education beyond the attendance and course requirements of the bachelor's program. This is to be evidenced by material provided as appendices, as appropriate,
- 2.3.5 a declaration that the essay is the applicant's own work, and that the applicant has clearly identified any ideas taken from outside sources.

### 3. Aptitude Assessment Commission, Selection Committees

- 3.1 <sup>1</sup>Aptitude assessment is administered by the Aptitude Assessment Commission and the Selection Committees. <sup>2</sup>The Commission is responsible for preparing the aptitude assessment process, organizing it and ensuring a structured and standardized process for determining aptitude within the framework of these Regulations; it bears responsibility, insofar as no other body is specified by these Regulations or through delegation of its authority to another body. Selection Committees are to conduct the assessment process in accordance with Nr. 5 subject to Nr. 3.2 Sentence 11.
- 3.2 <sup>1</sup>The Commission consists of five members. <sup>2</sup>Members of the Commission are appointed by the Rector, in consultation with the Study Dean, from among the authorized examiners of the Integrative Research Center TUM Campus Straubing for Biotechnology and Sustainability, who are members of the degree program faculty. <sup>3</sup>Commission members must be university educators within the meaning of the Bavarian Act on Higher Education Staff (BayHSchPG). <sup>4</sup>The Departmental Student Council has the right to name a student representative to serve on the Commission in an advisory capacity. <sup>5</sup>A deputy is to be appointed for each member of the Commission. <sup>6</sup>The Commission elects a chairperson and a deputy chairperson from among its members. <sup>7</sup>Procedures are governed Art. 31 of the TUM Charter as last amended. <sup>8</sup>The term in office of Commission members is 4 years. <sup>9</sup>Extensions of the term of office and reappointments are possible. <sup>10</sup>Urgent decisions that cannot be postponed can be made by the chairperson on behalf of the Commission; He/She must inform the Commission of such decisions without delay. <sup>11</sup>The Academic Programs Office supports the Commission and the Selection Committee; the Commission may delegate to the Office the task of assessing formal admissions requirements in accordance with Nr. 4, as well as the determination of points to be awarded based on defined criteria for which there is no freedom of discretion involved. This includes, in particular, the conversion of grades and the calculation of the overall points earned by the applicant. The Office may also be involved in choosing the members of the Selection Committee from among the commissioners and assigning them to applicants.
- 3.3 <sup>1</sup>Each Selection Committee consists of two members of the Integrative Research Center TUM Campus Straubing for Biotechnology and Sustainability, who are authorized to conduct examinations in the degree program according to Art. 62(1) Sentence 1 of the Bavarian Higher Education Act [BayHSchG] in conjunction with the act governing examiners at institutions of higher education [*Hochschulprüferverordnung*]. <sup>2</sup>At least one member must be university educators within the meaning of the Bavarian Act on Higher Education Staff (BayHSchPG). <sup>3</sup>It is permissible to serve concurrently on both the Aptitude Assessment Commission and the Selection Committee. <sup>4</sup>Members of the Committee are appointed by the Commission for a term of 1 year; Nr. 3.2 Sentence 9 applies accordingly. <sup>5</sup>Different Selection Committees may be assigned to individual criteria and stages of the assessment process.

### 4. Admission to the Aptitude Assessment Process

- 4.1 Admission to the aptitude assessment process requires that all documentation specified in No. 2.3 has been submitted in a timely and complete fashion.

4.2 <sup>1</sup> Applicants who have fulfilled the requirements according to No. 4.1 will be assessed according to No. 5. <sup>2</sup> Applicants not suited the program will receive a letter of rejection stating the grounds for rejection and informing them of legal remedies.

## 5. The Aptitude Assessment Process

### 5.1 First Stage

5.1.1 <sup>1</sup> It will be assessed, on the basis of the written application documents required under no. 2.3, whether or not an applicant is suitable for a program pursuant to no. 1 (First stage of the aptitude assessment process). <sup>2</sup> The candidate's application documents will be evaluated on a scale ranging from 0 to 100 points, 0 being the worst and 100 the best possible result:

The following criteria will be applied to the evaluation:

#### a) Discipline-Specific Skills and Qualifications

<sup>1</sup> The curricular analysis is conducted on the basis of competencies, rather than a schematic comparison of modules. <sup>2</sup> The analysis is based on the fundamental subject groups listed in the following table of the bachelor's program in the technology of biogenic resources at the Technical University of Munich.

Academic subject area	Credits TUM
Mathematics and Informatics Fundamentals of Mathematics Mathematics Concentration in Calculus and Linear Algebra Fundamentals of Informatics	5 5 5
Natural Science Fundamentals of Organic Chemistry Fundamentals of Biology	5 5
Engineering Sciences Fundamentals of Thermodynamics Technical Mechanics Structural Analysis Materials Science	5 5 5
Energy Technology Energy Technology Electrotechnology	5 5
Process Engineering Chemical Reaction Engineering Thermal Separation Principles	5 5

<sup>3</sup> If it is established that there are no significant differences in the competencies acquired (learning outcomes), a maximum of 60 points will be awarded. <sup>4</sup> If this value is not a whole number, it will be rounded up. <sup>5</sup> For any competencies missing from the student's undergraduate curriculum, points equivalent to the amount of module credits for the respective competencies in the TUM bachelor's program in the technology of biogenic resources will be deducted from the overall score.

#### b) Grade

<sup>1</sup> The applicant will be awarded one point for each tenth that the average calculated from examinations in the amount of 140 credits is better than 3.0. <sup>2</sup> The maximum number of points is 20. <sup>3</sup> Negative points will not be awarded. <sup>4</sup> Grades of international degrees will be converted by applying the Bavarian formula. The calculation will be based on the information provided in the Excel table under 2.3.1 The applicant needs to submit a list of the modules on the Transcript of records and confirm their accuracy in writing.

<sup>5</sup> If the candidate has submitted a degree certificate containing more than 140 credits with the application, the assessment will be made on the basis of the best graded modules in the amount of 140 credits.

<sup>7</sup>If the candidate submits this list, the average is calculated from graded module examinations with the best grades amounting to 140 credits; if no list is submitted, the overall average of grades submitted by the candidate will be used to calculate the average. <sup>8</sup>The overall grade average is calculated as a weighted grade average. <sup>9</sup>The grade weights of the individual modules correspond to the credits assigned to each module.

c) Letter of motivation

<sup>1</sup>The applicant's written statement will be evaluated by the committee members and graded on a scale of 0 – 20 points. <sup>2</sup>The content will be assessed using the following criteria:

1. correct English spelling and grammar (2 points),
2. clear and logical structure (3 points),
3. well-structured presentation of the link between personal interests and the subject matter of the degree program (5 points),
4. convincing reasons for the applicant's exceptional motivation for the master's degree program using arguments and meaningful examples (see 2.3.4) (10 points).

5.1.2 <sup>3</sup>Committee members independently assess each of the criteria with equal weighting. <sup>4</sup>The points total will be calculated as the arithmetic means of the individual assessments, rounded up to the nearest full point. <sup>1</sup> Applicants who have achieved 70 points will receive confirmation that they have passed the aptitude assessment. <sup>2</sup>In those cases where it is determined that only some subject-specific requirements for the master's program are missing from undergraduate studies, the Selection Committee may require that applicants complete fundamentals exams from the bachelor's degree program in technology of biogenic resources amounting to a maximum of 30 credits. <sup>3</sup>These fundamentals exams must be completed in the first year of study. <sup>4</sup>Failed fundamentals exams may be repeated only once and at the next examination date. <sup>5</sup>The Examination Board may make the admission to individual module examinations dependent on the successful completion of the fundamentals exam.

5.1.3 <sup>1</sup>Applicants who have achieved less than 50 points fail the aptitude assessment.

## 5.2 Second Stage:

5.2.1 <sup>1</sup>The remaining applicants will be invited to a test (written and anonymized performance assessment). <sup>2</sup>In the second stage of the aptitude assessment, the qualifications acquired in the bachelor's degree program and the result of the written test are evaluated, whereby the qualification acquired in the bachelor's is to be weighted equally.

5.2.2 <sup>1</sup>The date of the test will be announced at least one week in advance. <sup>2</sup>Time slots for the test must be scheduled before expiration of the application deadline. <sup>3</sup>The appointment for the test must be kept by the applicant. <sup>4</sup>The performance assessment will take place just once per application phase. <sup>5</sup>Missed testing dates cannot be rescheduled.

5.2.3 <sup>1</sup>The written performance assessment takes 80 minutes. <sup>2</sup>The purpose of the test is to demonstrate whether it can be expected that the applicant will attain the goal of the degree program on a scientific basis independently and responsibly and whether he or she has the general level of knowledge corresponding to the fundamentals of the relevant bachelor's degree program so that successful completion of the degree program is to be expected. <sup>3</sup>The tests will cover the following topics: mathematics, technical mechanics, materials science and thermodynamics, each of which are graded with a maximum of 20 points. <sup>4</sup>Any subject-specific academic knowledge that is to be taught in the master's degree program Technology of Biogenic Resources will not affect the decision. <sup>5</sup>Applicants must demonstrate in the test that they are suitable for the degree program. <sup>6</sup>The maximum possible number of points in the performance assessment is 80. <sup>7</sup>Committee members independently assess the written test. <sup>8</sup>The points total will be calculated as the arithmetic means of the individual assessments, rounded up to the nearest full point.

- 5.2.4 <sup>1</sup>The total number of points awarded in stage 2 is the sum of the points from 5.2.3 and the points from 5.1.1.a )(subject-specific qualification) and 5.1.1.b )(Final Grade). <sup>2</sup>Applicants with 110 or more points will be deemed suitable.  
<sup>3</sup>Applicants with an overall grade of less than 110 points have failed the aptitude assessment.
- 5.2.5 <sup>1</sup>The applicant will be notified of the result of the aptitude assessment (where appropriate, in compliance with the requirements set out in 5.1.3 sentence 2) in writing. <sup>2</sup>The official notification is to be signed by the President of the Technical University of Munich. <sup>3</sup> Signatory power may be delegated. <sup>4</sup>A rejection notice must specify the reasons for the rejection and provide information on legal remedies.
- 5.2.6 Admissions to the Master's Program in Technology of Biogenic Resources apply to all subsequent applications for this program.

### 5.3 Determination and Notification of Results

- <sup>1</sup>Applicants will be informed of the results of the aptitude assessment through official notification.  
<sup>3</sup>Applicants not suited for the program will receive a letter of rejection stating the grounds for rejection and informing them of legal remedies.
- 5.4 Candidate's suitability for the program, once determined in aptitude assessment, applies to all subsequent applications for this program.

## 6. Record

<sup>1</sup>The aptitude assessment process must be documented, in particular the names of the participating members of the Selection Committee, the evaluation of the first and second stages, as well as the overall results. <sup>2</sup>A record is to be kept about the conduct of the test (date, place, beginning and end of the test, the names of the members of the Committee present, the names of the applicants, as well as any unusual occurrences).

## 7. Repeat Aptitude Assessments

Applicants who have failed an aptitude assessment may apply once to repeat the aptitude assessment process.

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Executed following a resolution of the Senate of the Technical University of Munich dated 29 January 2020 and approval of the President of the Technical University of Munich dated 18 May 2020.

Munich, 18 May 2020  
 Technical University of Munich

Thomas F. Hofmann  
 President

These Regulations were made available for inspection at the Technical University of Munich on 18 May 2020, following their announcement on 18 May 2020. Day of proclamation is therefore be 19 August 2019.