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## **Qualifying Examination and Study Regulations for the Master's Degree Program in Management and Technology (TUM-BWL) at the Technical University of Munich**

dated June, 21 2017.

Based on Article 13 (1) Line 2 together with Article 58 (1) Line 1, Article 61 (2) Line 1, as well as Article 43 (5) of the Bavarian Higher Education Act (Bayerisches Hochschulgesetz - BayHSchG), the Technical University of Munich passes the following statute:

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### **§ 34**

#### **Applicability, Academic Degree, Related Programs**

- (1) <sup>1</sup>The qualifying examination and study regulations (Fachprüfungs- und Studienordnung - FPSO) for the Master's program in Management and Technology (TUM-BWL) supplements the general examination and study regulations for Bachelor's and Master's programs at the Technical University of Munich (Allgemeine Prüfungs- und Studienordnung - APSO) dated March 18, 2011, in the currently valid version. <sup>2</sup>The APSO takes precedence.
- (2) <sup>1</sup>Upon the successful completion of the Master's examination, the academic title Master of Science (M.Sc.) is awarded. <sup>2</sup>This academic degree can be indicated with the university supplement 'TUM'.
- (3) <sup>1</sup>The Master's programs 'Technologie- und Managementorientierte Betriebswirtschaftslehre' (Technology- and Management-oriented Business Administration) and 'Management and Technology' at the Technical University of Munich are related programs. <sup>2</sup>If transferring to the TUM from a different university, the governing examination committee shall make decisions about the relation of the study programs based on the examination and study regulations of the corresponding university.

### **§ 35**

#### **Program Start, Standard Period of Study, ECTS**

- (1) Commencement of the Master's program in Management and Technology (TUM-BWL) at the Technical University of Munich is possible in the winter or summer semester.
- (2) <sup>1</sup>The number of credits required for the achievement of the Master's in the required and elective areas is 90 (min. 55 hours of weekly study), over a period of three semesters\*. <sup>2</sup>To this is added a maximum of 30 credits (max. six months) for writing the Master's Thesis in accordance with § 46. The scope of coursework and examinations in the required and elective areas in accordance with Appendix 1 (II) is therefore at least 120 credits for the Master's program in Management and Technology (TUM-BWL). The standard period of study for the Master's program is a total of four semesters.

### **§ 36**

#### **Qualification Requirements**

- (1) Qualification for the Master's program in Management and Technology (TUM-BWL) is evidenced by:
  1. a qualified bachelor's degree or at least a comparable education covering a minimum of six semesters from a German or foreign institution of higher education in a program for technology and management-oriented business administration, business administration, economics or a comparable program of study;
  2. adequate knowledge of English; students whose studies were not conducted in English must prove competency with a recognized language test such as the Test of English as a Foreign Language (TOEFL) (at least 88 points), the International English Language Testing System (IELTS) (at least 6.5 points), the Cambridge Main Suite of English Examinations; alternatively, this can be proved by a good grade in English (at least 10-15 points) in a German higher education entrance qualification; if the foundational degree program covered examinations worth 12 credits in English

language examination modules, or if a GMAT score of at least 600 points can be proven, then this is also evidence of adequate knowledge of the English language; and

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3. passing the aptitude assessment in accordance with Appendix 2.
- (2) A higher education degree in the sense of Section 1 is qualified if there is no essential difference with the scholarship of the relevant bachelor's studies referred to in Section 1 No. 1 and at the latest at the time of application at least 25 ECTS in business administration modules, at least 5 ECTS in the area of economics and at least 12 ECTS in the area of engineering or natural sciences have been completed, and these meet the department requirements for the Master's program.
- (3) To assess qualification in accordance with Section 2, reference will be made to the module catalog for the Bachelor's program in Management and Technology.
- (4) The comparability of programs, the subject-specific aptitude as well as the transfer of credits acquired from foreign institutions will be decided upon by the Commission for Aptitude Assessment in compliance with Article 63 of the Bayerisches Hochschulgesetz (Bavarian Higher Education Act).

### § 37

#### **Modularization, Module Examination, Courses, Courses of Study, Language of Instruction**

- (1) <sup>1</sup>General regulations for modules and courses are set forth in §§ 6 and 8 APSO. <sup>2</sup>For deviations to module regulations, § 12 (8) APSO applies.
- (2) The curriculum listing the required and elective courses is included in Appendix 1 (III).
- (3) <sup>1</sup>The fundamental language of instruction in the Master's program in Management and Technology (TUM-BWL) is English. <sup>2</sup>In addition to English-language modules, some modules will be offered in German. <sup>3</sup>If a module description **indicated** that it is taught in either English or in German, the examiner shall make a binding indication of the specific language of instruction in a suitable way no later than before the commencement of the course. <sup>4</sup>However, if a student has not demonstrated knowledge of the German language at the time of application, admission shall be contingent upon the student successfully completing at least one module by the end of the second semester, in which integrative German language skills are acquired. <sup>5</sup>The Examination Committee will make the offer in the customary manner. <sup>6</sup>Voluntary efforts, including attendance at extra-curricular activities such as German language courses at a language school, will also be recognized.

### § 37a

#### **Project Studies**

- (1) <sup>1</sup>Project studies consist of project work involving active cooperation in a practical or research project that is relevant to the contents of the degree program. <sup>2</sup>This is to be completed by the end of the fourth semester by a group consisting of at least two students. <sup>3</sup>For grading, the provisions of § 17 APSO shall apply. <sup>4</sup>Project studies may be completed within the framework of elective modules for a total of 12 credits. <sup>5</sup>Project studies are an elective module and are a part of the Electives in Management and Technology catalog, and can be substituted by other electives from the catalog.

- (2) <sup>1</sup>The Project Studies module will be supervised by a university teacher from the School of Management. <sup>2</sup>At the latest when registering for Project Studies, this faculty member will identify which kinds of examinations consistent with the intent of § 41 (1) d) are to be successfully completed and how these examinations are weighted. <sup>3</sup>Academic employees may also serve as examiners if the corresponding prerequisites of the currently applicable university examination procedures are met.

### § 38

#### **Examination Deadlines, Monitoring of Academic Progress, Missed Deadlines**

Examination deadlines, monitoring of academic progress and missed deadlines are regulated in § 10 APSO.

### § 39

#### **Examination Committee**

According to § 29 APSO, the department responsible for decisions in examination matters is the Master's Examination Committee from the TUM School of Management.

### § 40

#### **Credit for Studies, Coursework and Examinations**

Credit for studies, coursework and examinations are regulated by § 16 APSO.

Coursework and examinations offered at the École des hautes études commerciales de Paris (HEC Paris) within the framework of this Master's degree course are recognized without an equivalency assessment.

### § 41

#### **Integrated Examination Procedure, Examination Methods**

- (1) In addition to written and oral examinations, this program potentially involves other examinations in accordance with §§ 12 and 13 APSO, in particular laboratory activities, exercises (possibly attestations), reports, project work, presentations, learning portfolios and scientific papers.
- a) <sup>1</sup>A **written exam** is taken under supervision, with the aim of recognizing problems and finding ways to solve them, including their potential application, within a limited time and using the given methods and defined aids. <sup>2</sup>The duration of examinations is regulated in § 12 (7) APSO.
  - b) <sup>1</sup>**Laboratory activities** include, depending on the subject discipline, tests, measurements, fieldwork, field exercises and other activities with the aim of carrying out, evaluating and gaining knowledge. <sup>2</sup>Examples include the following: practical experiments, the description of procedures and the theoretical foundations thereof, including the literature, the preparation (if necessary also in the form of exercises) and practical implementation, necessary calculations, documentation and evaluation, as

well as the interpretation of the results with regard to the findings to be elaborated.  
<sup>3</sup>The laboratory activity can be supplemented by a report, a scientific paper or a presentation in order to verify communicative competence in the presentation of scientific topics in written form or before an audience.

<sup>4</sup>The concrete components of the corresponding laboratory activity, and the competencies to be checked by this, are identified in the module description.

- c) <sup>1</sup>An **exercise (or possibly attestation)** is the processing of predefined tasks (e.g. mathematical problems, programming tasks, creation of models, etc.) with the goal of applying theoretical contents to solve problems related to application. <sup>2</sup>This is used to verify factual and detailed knowledge as well as its application. <sup>3</sup>The exercises can be written, oral or electronic, for example. <sup>4</sup>Possible types are, for example, homework, exercise sheets, programming exercises, tests (including e-tests), tasks within the framework of university internships, etc. <sup>5</sup>The concrete components of the corresponding exercises and the competencies to be checked therewith are identified in the module descriptions.
- d) <sup>1</sup>A **report** is a written clarification and summary of a learning process with the objective of presenting the material learned in a structured manner and analyzing the results in the context of a module. <sup>2</sup>The report should show that the essential aspects were understood and could be relayed in writing. <sup>3</sup>Possible report forms are, for example, reports on excursions or internships, work reports, etc. <sup>4</sup>The written report can be supplemented with a presentation in order to check the communication skills when presenting the content in front of an audience.
- e) <sup>1</sup>**Project work** involves a project assignment with a defined goal within a defined time period and using suitable tools, to be achieved in several phases (initiation, problem definition, role distribution, brainstorming, criteria development, decision making, implementation, presentation, written evaluation). <sup>2</sup>In addition, a presentation can be a component of the project in order to check communication skills when presenting scientific topics in front of an audience. <sup>3</sup>The concrete components of the corresponding project work and the competencies to be checked therewith are identified in the module description. <sup>4</sup>Project work can also be completed as a group activity. <sup>5</sup>In this case, it should be proven that tasks were solved in a team. <sup>6</sup>The contribution, which is to be assessed as an examination, must be able to be clearly and individually identified and possible to assess. <sup>7</sup>This also applies to the individual contribution to the group result.
- f) <sup>1</sup>A **scientific paper** is a written work in which a challenging scientific question or question oriented toward a scientific application is solved independently using the scientific methods of the corresponding subject discipline. <sup>2</sup>It should be able to demonstrate that a question related to the learning outcomes for the corresponding module can be comprehensively addressed in compliance with the guidelines for academic work – from analysis, to concept to implementation. <sup>3</sup>Possible types, which differ in their academic level of sophistication, include, for example, thesis paper, abstract, essay, research paper and seminar paper. <sup>4</sup>The scientific paper can be supplemented with a presentation and potentially a colloquium to check the communication skills for the presentation of scientific topics in front of an audience. <sup>5</sup>The concrete components of the scientific paper, and the competencies to be checked therewith, are indicated in the module description.
- g) <sup>1</sup>A **presentation** is a systematic, structured, oral presentation that is visually supported using suitable media (such as projector, slides, poster or video), in which specific topics or results are displayed and summarized and complex subjects are reduced to their essential core. <sup>2</sup>The presentation should demonstrate competencies in processing a specific topic within a given time frame such that it can be presented to an audience in a clear, structured and understandable manner. <sup>3</sup>It should also demonstrate that, in relation to the corresponding topic, it is possible to professionally respond to questions, suggestions or discussion points from the audience. <sup>4</sup>The presentation can be supplemented with a short written paper. <sup>5</sup>The presentation can be made individually or as part of a group activity.





<sup>6</sup>The contribution, which is to be assessed as an examination, must be able to be clearly and individually identified and possible to assess. <sup>7</sup>This also applies to the individual contribution to the group result.

h) <sup>1</sup>An **oral examination** is a conversation on certain topics during which questions require specific answers within a limited time period. <sup>2</sup>Oral examinations should demonstrate that the qualification objectives identified in the module descriptions have been achieved, and that correlations within the subject tested were understood and that special questions in this context can be answered. <sup>3</sup>The oral examination can be performed as an individual or group examination. <sup>4</sup>The time required for the examination is regulated in § 13 (2) APSO.

i) <sup>1</sup>A **learning portfolio** is a written presentation of one's own work, selected according to previously defined criteria, which demonstrates the learning progress and performance at a certain point in time and with respect to defined content. <sup>2</sup>Justification must be made for the selection of work, its relation to individual learning progress and its ability to demonstrate the achievement of the qualification objectives. <sup>3</sup>The learning portfolio should demonstrate that responsibility was taken for the learning process and the qualification objectives documented in the module description were achieved. <sup>4</sup>Appropriate to a given module description, components of successful self-testing of the learning portfolio especially include work with a specific relationship to the application, Internet pages, blogs, bibliographies, analyses, thesis papers and graphic presentations of a subject or issue. <sup>5</sup>The concrete components of the corresponding learning portfolio and the competencies to be checked therewith are identified in the module description.

(2) <sup>1</sup>The module examinations are generally taken during the course of study. <sup>2</sup>The type and duration of a module examination can be found in Appendix 1 (II). <sup>3</sup>For deviations from these rules, refer to § 12 (8) APSO. <sup>4</sup>For the assessment of the module examination, § 17 APSO applies. <sup>5</sup>Grade weighting for module examinations corresponds to the weighting factors assigned in Appendix 1 (II). <sup>6</sup>The modules identified by a \* in Appendix 1 (II) are only successfully completed if every partial module examination has been successfully passed.

(3) Upon the request of the student and with the approval of the examiner, modules held in German can offer examinations in English.

## § 42

### Registration and Admission for the Master's Examination

(1) <sup>1</sup>With matriculation in the Master's program Management and Technology (TUM-BWL), students are admitted to the module examinations for the Master's examination. <sup>2</sup>If the student successfully completed the modules in the engineering / natural sciences specialization during the Bachelor's program, the student is only admitted to the module examinations for the advanced modules, which are indicated by 'major' in the corresponding specialization. <sup>3</sup>Likewise, students are considered to be admitted to individual module exams who take additional examinations within the framework of the consecutive Bachelor's program Management and Technology at the Technical University of Munich in accordance with § 46a of the Qualifying Examination and Study Regulations for the Bachelor's program Management and Technology at the Technical University of Munich from September 13, 2013 in the applicable version.

<sup>4</sup>If admission to individual modules is dependent on passing other modules, this is indicated specifically in Appendix I.

- (2) <sup>1</sup>Registration for a module examination in compulsory and elective courses is regulated by § 15 (1) APSO. <sup>2</sup>The registration requirements for repeat examinations for failed 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 corresponding modules in accordance with Section 2,
  2. the Master's Thesis in accordance with § 46, and
  3. coursework indicated in § 45.

- (2) <sup>1</sup>The module examinations are listed in Appendix 1 (II).

<sup>2</sup>One of the seven management specializations must be selected. <sup>3</sup>In selecting a specialization, the number of credits in the following elective areas must be earned:

1. Innovation & Entrepreneurship, min. 30 credits
2. Marketing, Strategy & Leadership, min. 30 credits
3. Operations & Supply Chain Management, min. 30 credits
4. Finance & Accounting, min. 30 credits
5. Economics & Policy, min. 30 credits
6. Energy Markets, min. 30 credits
7. Life Sciences & Management, min. 30 credits.

<sup>4</sup>From this number a minimum of 6 credits must be earned in an advanced seminar for the corresponding specialization. <sup>5</sup>In addition, one of the 11 engineering / natural sciences specializations must be selected. <sup>6</sup>In selecting a specialization, the number of credits in the following elective areas must be earned:

1. Mechanical Engineering major, min. 30 credits
2. Informatics major, min. 30 credits
3. Chemistry major, min. 30 credits
4. Electrical Engineering and Information Technology major, min. 30 credits
5. Computer Engineering major, min 30 credits
6. Engineering minor, min. 30 credits
7. Informatics minor, min. 30 credits
8. Chemistry minor, compulsory modules of 18 credits and elective modules of at least 12 credits
9. Electrical Engineering and Information Technology minor are from electives from Elective Category 1 of at least 10 credits and from Elective Category 2 of at least 20 credits
10. Computer Engineering minor, min. 30 credits
11. Industrial Engineering minor, min. 30 credits

<sup>6</sup>In addition, electives of at least 30 credits must be completed in a management-technical area. <sup>7</sup>In selecting modules, it is important to comply with § 8 (2) APSO.

### **§ 44**

#### **Repeating an Examination, Failed Examinations**

- (1) Repeating examinations is regulated in § 24 APSO.

- (2) Failure of examinations is regulated in § 23 APSO.

## **§ 45 Coursework**

In addition to the examinations indicated in § 43 (1), it is also necessary to successfully complete coursework in the modules in accordance with Appendix I.

### **§ 45a Multiple-Choice Procedure**

The procedure for multiple-choice examinations is regulated in § 12a APSO.

## **§ 46 Master's Thesis**

- (1) <sup>1</sup>According to § 18 APSO, students must write a Master's Thesis as part of the Master's examination. <sup>2</sup>The Master's Thesis can be assigned and supervised by expert examiners from the Technical University of Munich (supervisors). <sup>3</sup>Pursuant to Line 2, the qualified examiners are assigned by the Examination Committee.
- (2) <sup>1</sup>The prerequisite for admission to the Master's Thesis module is the acquisition of at least 48 credits, of which at least 18 credits are from the engineering / natural sciences specialization (cf. Appendix 1 (II)). <sup>2</sup>Work on the Master's Thesis should commence after successful completion of all module examinations.
- (3) <sup>1</sup>The period of time between topic assignment and submission of the completed Master's Thesis must not exceed six months. <sup>2</sup>The Master's Thesis is considered completed and not passed if it is not submitted on time, unless recognized serious reasons are presented in accordance with § 10 (7) APSO. <sup>3</sup>The Master's Thesis is to be written in English.
- (4) <sup>1</sup>If the Master's thesis does not receive at least a grade of 'Sufficient' (4.0), it may be repeated once with a new topic. <sup>2</sup>Students must renew their application for admission within six weeks from receipt of the grade.

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

- (1) The Master's examination is passed when all examinations have been passed in the scope of the Master's examination in accordance with § 43 (1), and at least 120 credit points have been earned.
- (2) <sup>1</sup>The module grade is calculated in accordance with § 17 APSO. <sup>2</sup>The overall grade for the Master's examination will be calculated as a weighted grade average from the modules in accordance with § 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 pursuant to § 17 of the APSO.

## § 48 Degree Certificate, Diploma, Diploma Supplement

<sup>1</sup>Once the Master's examination has been passed, a degree certificate, a diploma and a diploma supplement are to be issued with a transcript of records in compliance with § 25 (1) and § 26 APSO. <sup>2</sup>The date to be entered on the degree certificate is the day when all examination and coursework requirements have been fulfilled.

## § 49 Double Degree

- (1) <sup>1</sup>The Technical University of Munich and the Chambre de Commerce et d'Industrie de Paris, as directed by its educational institution HEC Paris, have a cooperation agreement. <sup>2</sup>For students who participate in the double degree program with HEC Paris, the following special regulations apply:
1. <sup>1</sup>The selection of participants takes place in two stages. <sup>2</sup>First, potential students are selected on the basis of secondary school success, post-secondary school success, motivation and language skills. <sup>3</sup>Students who begin their studies at the Technical University of Munich will also be selected based on their knowledge of the French language. <sup>4</sup>Subsequently, a final selection is made on the basis of personal interviews with representatives of both universities.
  2. <sup>1</sup>Students who begin their studies at the Technical University of Munich must successfully complete the first two semesters at TUM and have earned at least 40 credits in order to be able to continue their studies at the HEC Paris in the third and fourth semesters. <sup>2</sup>Students who begin their studies at HEC Paris first complete their studies for one year in the first stage of the Master of Science in Management program at HEC Paris.
  3. <sup>1</sup>Students who have to complete the first two semesters at the Technical University of Munich must earn at least 40 credits at HEC Paris. <sup>2</sup>From this total, 30 credits are transferred to the Technical University of Munich for the management-technical elective in the Master's program Management and Technology (TUM-BWL). <sup>3</sup>In addition, students must complete a qualified internship for at least 15 weeks. <sup>4</sup>The internship may commence only after completion of the Bachelor's program and should be located in France. <sup>5</sup>Students may also apply to the certification program at HEC Paris. <sup>6</sup>For this they will receive an additional 15 credits.
  4. <sup>1</sup>Of the 30 credits for the Master's thesis at the Technical University of Munich, 20 credits are awarded for the research paper at HEC Paris. <sup>2</sup>Students have the opportunity to begin the research paper at HEC Paris and then to develop it further as their Master's thesis at the Technical University of Munich.
  5. <sup>1</sup>Students who have to complete the first year at HEC Paris must, as a deviation from No. 2.3.1 in Appendix 2: Aptitude Assessment, submit with their application for admission to the Master's program Management and Technology (TUM-BWL) at TUM a transcript of records with modules totaling at least 180 credits in a program complying with § 36 (1) No. 1; submission of a curricular analysis will not be required. <sup>2</sup>Furthermore, in deviation from § 36 (1) No. 2, certification from HEC Paris regarding the English language nature of the program will be accepted for admission to TUM as proof of adequate knowledge of English. <sup>3</sup>Students can use the time between their first year of study at HEC Paris and the second year of study at the Technical University of Munich for an internship in Germany.

6. <sup>1</sup>For students who begin their studies at HEC Paris, studying at the Technical University of Munich will take at least three semesters. <sup>2</sup>During these three semesters, students will engage coursework in management for 30 credits and in an engineering or natural sciences specialization for 30 credits. <sup>3</sup>In addition these students write their Master's thesis for a total of 30 credits at the Technical University of Munich. <sup>4</sup>The Master's thesis is recognized by HEC Paris as a research paper for 20 credits.
7. Upon successful completion of the double degree program, students receive a Master of Science (M.Sc.) degree from the Technical University of Munich and an HEC Master of Science in Management Grande École degree from HEC Paris.

## **§ 50**

### **Entry into Force**

- (1) <sup>1</sup>This statute becomes effective on ..... <sup>2</sup>This applies for all students that start their degree program at the Technical University of Munich beginning with winter semester 2017/2018.
- (2) <sup>1</sup>The Master's program Management and Technology (TUM-BWL) replaces the Master's programs Technologie- und Managementorientierte Betriebswirtschaftslehre (Technology and Management-oriented Business Administration) and Wirtschaft mit Technologie (Business with Technology) at the Technical University of Munich. <sup>2</sup>Applications for acceptance to the program based on these qualifying examination and study regulations, as a transfer from the programs indicated, with a carryover of the coursework and examinations previously completed, can be submitted no later than November 30, 2017. <sup>3</sup>The aptitude assessment for the Master's degree programs 'Technologie- und Managementorientierte Betriebswirtschaftslehre' and 'Wirtschaft mit Technologie' are considered to be equally valid.

Appendix 1:I. Scope of the Master's Examinations

	Components	Credits	Semester
1.	Examinations during the course of study for the purpose of earning credits in electives for the <b>technology specialization</b>	30	Semester 1/2/3/4
2.	Examinations during the course of study for the purpose of earning credits in electives for the <b>management specialization</b>	30	Semester 1/2/3/4
3.	Examinations during the course of study for the purpose of earning credits in electives for <b>management-technical subjects</b>	30	Semester 1/2/3/4
4.	<b>Master's Thesis</b> in accordance with § 46	30	Semester 3/4

## II. Examination Modules

### Management specialization

One of the management specializations in the following seven tables must be selected.

In the Innovation & Entrepreneurship specialization, one seminar must be successfully completed from the seminars offered in the framework of the Advanced Seminar in Innovation & Entrepreneurship for at least 6 credits.

In addition, within the Innovation & Entrepreneurship specialization, additional electives of a total of 24 credits must be earned from a supplementary elective catalog. The supplementary elective catalog will be announced by the TUM School of Management in a suitable and timely manner before the courses begin.

No.	Module name	Module type	Format	Sem.*	Hrs/wk	Credits	Exam type Weighting factor	Exam duration	Language of instruction
	Innovation & Entrepreneurship (IE)								
WIB33002	Advanced Seminar Innovation & Entrepreneurship	Elective	4 S	3rd/4th	4	6 credits	Scientific paper	n/a	English
WI000258	Empirical Research in Management and Economics	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam	120 min	German/English
WI000816	Labor law	Elective	2 L + 2 E	1st/3rd	4	6 credits	Written exam	120 min	German/English
WI000116	Lead user project	Elective	4 S	3rd/4th	4	6 credits	Project work	n/a	German/English
WI000259	Case Study: Strat. Mgmt. of Technology & Innovation	Elective	4 S	2nd/4th	4	6 credits	Scientific paper	n/a	English
WI001154	Managing Innovation: From Theory to Decision Simulation	Elective	4 S	1st-4th	4	6 credits	Lab activity	n/a	German/English
WI001004	Financial Modeling in Private Equity	Elective	4 L	1st/3rd	4	6 credits	Written exam	60 min	English
WI001038	Management of Family-run Businesses	Elective	2 S	1st/3rd	2	6 credits	Scientific paper	n/a	German/English
WIB18815	Advanced Topics in Innovation & Entrepreneurship	Elective	4 S	2nd/3rd/4th	4	6 credits	Scientific paper	n/a	German/English



In the management specialization Marketing, Strategy & Leadership, one seminar must be successfully completed for at least 6 credits from the Advanced Seminars for Marketing, Strategy & Leadership.

In addition, within the specialization Marketing, Strategy & Leadership, additional electives of a total of 24 credits must be earned from a supplementary elective catalog. The supplementary elective catalog will be announced by the TUM School of Management in a suitable and timely manner before the courses begin.

No.	Module name	Module type	Format	Sem.*	Hrs/wk	Credits	Exam type, weighting factor	Exam duration	Language of instruction
	Marketing, Strategy & Leadership (MSL)								
WIB17778	Advanced Seminar Marketing, Strategy & Leadership - Strategy and Organization	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	German/English
WIB35001	Advanced Seminar Marketing, Strategy & Leadership (Marketing)	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	German/English
WI000178	Organization and Leadership	Elective	2 L + 2 E	1st/3rd	4	6 credits	Written exam	120 min	English
WI001038	Management in Family Firms	Elective	2 S	1st/3rd	2	6 credits	Scientific paper	n/a	German/English
WI001090	Behavioral Pricing: Insights, Methods, and Strategy	Elective	4 S	1st/3rd	4	6 credits	Scientific paper	n/a	English
WI000817	Marketing Compliance	Elective	4 L	1st/3rd	4	6 credits	Written exam	120 min	German/English
WI001128	Strategies in MNEs	Elective	2 L + 2 E	1st/3rd	4	6 credits	Written exam	60 min	English
WI000816	Labor law	Elective	2 L + 2 E 4	1st/3rd	4	6 credits	Written exam	120 min	German/English
WI001140	Luxury Marketing	Elective	2 S	1st-4th	4	6 credits	Presentation Written exam 4:1	90 min	English
WI001116	Systematic Personnel Development	Elective	4 S	2nd/4th	4	6 credits	Written exam	120 min	German/English
WI000994	Negotiation Strategies	Elective	4 S	1st/3rd	4	6 credits	Scientific paper	n/a	German/English

In the management specialization Operations & Supply Chain Management, one seminar must be successfully completed for at least 6 credits from the Advanced Seminars for Operations & Supply Chain Management.

In addition, for the specialization Operations & Supply Chain Management, other electives for a total of 24 credits must be earned from a supplementary elective catalog. The supplementary elective catalog will be announced by the School of Management in a suitable and timely manner before the courses begin.

No.	Module name	Module type	Format	Sem.*	Hrs/wk	Credits	Exam type, weighting factor	Exam duration	Language of instruction
	Operations & Supply Chain Management (OSCM)								
WIB34001	Advanced Seminar Operations & Supply Chain Management	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	English
WI000979	Inventory Management	Elective	2 L + 2 E	2nd/4th	4	6 credits	Written exam	90 min	English
WI000976	Logistics and Operations Strategy	Elective	2 L + 2 E	1st/3rd	4	6 credits	Written exam	90 min	English
WI200541	Planning and Scheduling of Complex Operations: Models, Methods and Applications	Elective	4 L	1st-4th	4	6 credits	Written exam exercise 1:1	60 min	English
WI000977	Stochastic Modeling and Optimization	Elective	2 L + 2 E	1st/3rd	4	6 credits	Written exam	90 min	English
WI001034	Healthcare Operations Management	Elective	2 L + 2 E	2nd/4th	4	6 credits	Written exam + exercise 3:2	90 min	English
WI001118	Behavioral Operations Management	Elective	2 L + 2 E	1st/3rd	4	6 credits	Written exam + exercise 1:1	45 min	English
WI000836	Advanced Planning in Supply Chains - Illustrating the Concepts Using an SAP APO Case Study	Elective	3 L + 1 E	2nd/3rd/4th	4	6 credits	Written exam	90 min.	English
WI001135	Stochastic Optimization	Elective	2 L + 2 E	2nd/4th	4	6 credits	Written exam + exercise 3:2	120 min	English
WIB19823	Advanced Topics in Operations & Supply Chain Management	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	German/English

In the Finance & Accounting specialization, one seminar must be successfully completed from the seminars offered in the framework of the Advanced Seminars in Finance & Accounting for at least 6 credits.

In addition, within the Finance & Accounting specialization, additional electives of a total of 24 credits must be earned from a supplementary elective catalog. The supplementary elective catalog will be announced by the School of Management in a suitable and timely manner before the courses begin.

No.	Module name	Module type	Format	Sem.*	Hrs/wk	Credits	Exam type, weighting factor	Exam duration	Language of instruction
	Finance & Accounting (FA)								
WIB02250	Advanced Seminar Finance & Accounting	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	German/English
WI000232	Derivatives	Elective	2 S	2nd/4th	2	3 credits	Written exam	60 min	English
WI000231	Asset Management	Elective	4 S	1st/3rd	4	6 credits	Written exam	120 min	English
WI000092	Banking and Risk Management	Elective	2 S	1st/3rd	2	3 credits	Written exam	60 min	English
WI000998	Group Accounting and IFRS	Elective	2 L + 2 E	2nd/4th	4	6 credits	Written exam	120 min	German
WI000234	Value Based Management	Elective	2 L + 2 E	2nd/4th	4	6 credits	Written exam	120 min	English
WI000233	Management Accounting	Elective	4 S	1st/3rd	4	6 credits	Written exam	120 min	German/English
WI001004	Financial Modeling in Private Equity	Elective	4 L	1st/3rd	4	6 credits	Written exam	60 min	English
WI000138	Tax Law II	Elective	2 S	1st/3rd	2	3 credits	Written exam	60 min	German/English
WI001089	Capital Markets Law	Elective	1 L + 1 E	1st/3rd	2	3 credits	Written exam	60 min	German
WI000994	Negotiation Strategies	Elective	4 S	1st/3rd	4	6 credits	Scientific paper	n/a	German/English
WI001038	Management in Family Firms	Elective	2 S	1st/3rd	2	6 credits	Scientific paper	n/a	German/English
WI000993	Incentives and Performance Measurement	Elective	4 L	1st/3rd	4	6 credits	Written exam	120 min	German/English
WIB06746	Advanced Topics in Finance & Accounting	Elective	2 L	1st-4th	2	3 credits	Written exam	60 min	German/English

In the Economics & Policy specialization, one seminar must be successfully completed from the seminars offered in the framework of the Advanced Seminars in Economics & Policy for at least 6 credits.

In addition, within the Economics & Policy specialization, additional electives of a total of 24 credits must be earned from a supplementary elective catalog. The supplementary elective catalog will be announced by the School of Management in a suitable and timely manner before the courses begin.

No.	Module name	Module type	Format	Sem. *	Hrs/ wk	Credits	Exam type Weighting factor	Exam duration	Language of instruction
	Economics & Policy (EP)								
WIV05001	Advanced Seminar in Economics and Policy	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	German/English
WI000100	Economics III - Advanced Microeconomics	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam	120 min	German/English
WI000104	Public Economics I - Economic Theory of the State	Elective	2 L	1st-4th	2	3 credits	Written exam	60 min	German/English
WI000105	Public Economics II - Theory and Politics of	Elective	2 L	1st-4th	2	3 credits	Written exam	60 min	German/English
WI000107	Public Economics III - Theory and Politics of Public Debt	Elective	2 L	1st-4th	2	3 credits	Written exam	60 min	German/English
WI000109	Public Economics IV - Theory and Politics of Income Distribution	Elective	2 L	1st-4th	2	3 credits	Written exam	60 min	German/English
WI001133	Advanced Seminar in Economics and Policy	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	English
WI001145	Energy Economics	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam	120 min	English
WI000102	Industrial Organization	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam	120 min	German/English
WI001155	Environmental Economics and Environmental Management	Elective	4 L	1st-4th	4	6 credits	Written exam	120 min	German/English
WI000202	Environmental Politics	Elective	2 L	1st-4th	2	3 credits	Written exam	60 min	German/English

In the Energy Markets specialization, one seminar must be successfully completed from the seminars offered in the framework of the Advanced Seminars in Energy Markets for at least 6 credits.

In addition, within the business specialization Energy Markets, additional electives of a total of 24 credits must be earned from a supplementary elective catalog. The supplementary elective catalog will be announced by the School of Management in a suitable and timely manner before the courses begin.

No.	Module name	Module type	Format	Sem. *	Hrs/ wk	Credits	Exam type Weighting factor	Exam duration	Language of Instruction
	Energy Markets								
WIB29001	Advanced Seminar Energy Markets	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	German/English
WI000992	Energy Trading	Elective	2 L	2nd/4th	2	3 credits	Written exam	60 min	English
WI000946	Energy Markets I	Elective	2 L + 2 E	2nd/3rd/4th	4	6 credits	Written exam	60-120 min	English
WI001125	Energy Markets II	Elective	2 L + 2 E	2nd/3rd/4th	4	6 credits	Written exam	60 min	English
WI001039	Challenges in Energy Markets I	Elective	2 L	2nd/4th	2	3 credits	Written exam	60 min	German/English
WI001066	Challenges in Energy Markets II	Elective	2 L	1st/3rd	2	3 credits	Written exam	60 min	German/English
WI001145	Energy Economics	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam	120 min	English
WI001135	Stochastic Optimization	Elective	2 L + 2 E	2nd/4th	4	6 credits	Written exam + exercise 3:3	120 min	English
WI001144	Advanced Topics in Energy Trading	Elective	2 L + 2 E	2nd/4th	4	6 credits	Lab activity	n/a	English
WI001157	Advanced Seminar in Electricity Market Economics	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	German/English

In the Life Sciences & Management specialization, one seminar must be successfully completed from the seminars offered in the framework of the Advanced Seminars in Life Sciences & Management for at least 6 credits.

In addition, within the Life Sciences & Management specialization, additional electives of a total of 24 credits must be earned from a supplementary elective catalog. The supplementary elective catalog will be announced by the School of Management in a suitable and timely manner before the courses begin.

No.	Module name	Module type	Format	Sem.	Hrs/wk	Credits	Exam type Weighting factor	Exam duration	Language of instruction
	Life Sciences & Management (LSM)								
WIB14002	Advanced Seminar Life Sciences & Management	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	German/ English
WI000836	Advanced Planning in Supply Chains - Illustrating the Concepts Using an SAP APO Case Study	Elective	3 L + 1 E	2nd/3rd/ 4th	4	6 credits	Written exam + exercise 1:1	90 min.	English
WIB19002	Advanced Topics in Operations & Supply Chain Management	Elective	4 S	1st-4th	4	6 credits	Scientific paper	n/a	English
WI000948	Food Economics	Elective	2 L + 2 S	1st/3rd	4	6 credits	Oral exam + scientific paper 1:1	20 min	English
WI100311	Analysis in Agribusiness Marketing	Elective	2 L + 2 S	2nd/4th	4	6 credits	Written test + homework	120 min	German/ English
WI000739	Consumer Behavior	Elective	4 L	1st/3rd	4	6 credits	Written exam	120 min	English
WI001123	Sustainability Marketing and Consumption	Elective	4 S	2nd/4th	4	6 credits	Written exam	60 min	English
ED0027	Consumer History	Elective	2 L + 2 S	2nd/4th	4	6 credits	Scientific paper	n/a	English
WI000946	Energy Markets I	Elective	2 L + 2 E	2nd/3rd/ 4th	4	6 credits	Written exam	60-120 min	English
WI001125	Energy Markets II	Elective	2 L + 2 E	2nd/3rd/ 4th	4	6 credits	Written exam	60 min	English
WI000926	International Environmental Policy and Conflict Resolution	Elective	2 L + 2 S	1st/3rd	4	6 credits	Project work	n/a	English

## Engineering and Natural Sciences Specialization

Every student must select an engineering / natural sciences specialization and successfully complete modules for a total of 30 credits. The regulations are specific to the selected engineering / natural sciences subject.

### Mechanical Engineering

Depending on prior knowledge, a student may select a basic module or advanced module in mechanical engineering.

Within the selected outcomes-based module catalog, at least 30 credits of electives must be successfully earned. This sample elective catalog is continuously updated. The most current catalog is made available by the School of Management at the appropriate time and in the appropriate manner before classes begin.

Any student who has already successfully completed courses in the engineering / natural sciences subject Mechanical Engineering during a Bachelor's program may only select from the advanced courses (major) in Mechanical Engineering.

No.	Module name	Module type	Format	Sem. *	Hrs/wk	Credits	Exam type, Weighting factor	Exam duration	Language of instruction
	Mechanical Engineering+ (minor)								
MW2013 MW2016	CAD and Machines Drawing 1 and 2	Elective	2 L + 2 E	1st /2nd	4	5	2 E (course-work) + written exam	60 min	German
MW1108	Engineering Mechanics (for TUM-BWL separate)	Elective	2 L + 2 E	1st	4	6	Written exam	120 min	German
MW1694	Machine Elements and Manufacturing	Elective	3 L + 2 E	3rd	5	7	Written exam	120 min	German
BV350007	Materials in Engineering	Elective	2 L + 2 E	2nd	4	6	Written exam	90 min	German
MW2021	Fluid Mechanics I <sup>2)</sup>	Elective	2 L + 2 E	4th	4	5	Written exam	90 min	German
MW1903	Bioprocess Engineering	Elective	2 L + 1 E	1st/3rd	3	5	Written exam	90 min	German
MW1918	Industrial Software Development for Engineers	Elective	2 L + 1 E	2nd/4th	3	5	Written exam	90 min	German
MW1932	Metal Forming	Elective	2 L + 1 E	2nd/4th	3	5	Written exam	90 min	German
MW2015	Basics of Thermodynamics	Elective	3 L + 2 E	1st/3rd	5	6	Written exam	120 min	German
MW2156	Metal-cutting Manufacturing Processes	Elective	2 L + 1 E	2nd/4th	3	5	Written exam	90 min	German

- 1) Students who select Machine Elements should have a mastery of the skills from the modules CAD and Machine Drawing, as well as Materials in Mechanical Engineering.
- 2) Students who wish to select Fundamentals of Fluid Mechanics 1 should have a mastery of the skills from the module Technical Mechanics.

	Advanced Mechanical Engineering (major)								
MW1921	Material Flow and Logistics	Elective	3 L	1st/3rd	3	5 credits	Written exam	90 min	German
MW1902	Industrial Automation	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German
MW0084	Assembly Technologies	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German
MW0102	Production Ergonomics	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German
MW0068	Material Flow Systems	Elective	3 L	2nd/4th	3	5 credits	Written exam	90 min	German
MW0097	Layout planning of logistical systems Planning	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	German
MW2129	Ergonomics	Elective	2 L + 1 E	1st/3rd	n/a	5 credits	Written exam	90 min	German
MW0107	Networked Production	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	German
MW0036	Factory Planning	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	German
MW0049	Joining Technologies	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	German
MW0010	System Engineering for Vehicle Drive Lines	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German
MW1911	Basics of Motor Vehicle Construction	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German
MW1919	Light Weight Structures	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German
MW0101	Ergonomic Product Design	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	German
MW1909	Energy Systems 1 <sup>3)</sup>	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German
MW1740	Sustainable Energy Systems with seminar	Elective	2 L + 2 S	2nd/4th	3	5 credits	Written and oral exams	60 min	German
MW2023	Heat Transfer Phenomena	Elective	2 L + 1 E	2nd/4th	3	4 credits	Written exam	90 min	German
MW2244	Energy from Biomass and Residuals	Elective	2 L + 1 E	2nd/4th	3	5 credits	Oral exam	30 min	German
MW1272	Solar Engineering	Elective	2 L + 1 E	2nd/4th	3	6 credits	Written exam	120 min	German
MW2119	Turbomachinery	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German

3) Students who select Energy Systems must have a mastery of skills from the Thermodynamics module of the Bachelor's program.



## Informatics

Depending on prior knowledge, a student may select a basic module or advanced module in informatics.

Within the selected outcomes-based module catalog, at least 30 credits of electives must be successfully earned. This sample elective catalog is continuously updated. The most current catalog is made available by the School of Management at the appropriate time and in the appropriate manner before classes begin.

Any student who has already successfully completed courses in the engineering / natural sciences subject Informatics during a Bachelor's program may only select from the advanced courses (major) in Informatics.

No.	Module name	Module type	Format	Sem.*	Hrs/wk	Credits	Exam type Weighting factor	Exam duration	Language of instruction
	Informatics Basic Modules (Minor)								
IN0001	Introduction to Informatics 1	Elective	4 L	1st	5	6 credits	Written exam	90 - 150 min	German
IN8024	Information Management for Digital Business Models	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam	90 - 150 min	German/ English
IN0004	Introduction to Computer Organization and Technology - Computer	Elective	4 L + 2 E	1st-4th	6	8 credits	Written exam	120	German
IN0002	Fundamentals of Programming (Exercises & Laboratory)	Elective	3 IN + 1 E	1st	4	6 credits	Exercise	n/a	German
IN0006	Introduction to Software Engineering	Elective	3 L + 2 E	1st-4th	5	6 credits	Written exam	90 - 150 min	German
IN0009	Basic Principles: Operating Systems and System Software	Elective	3 L + 1 E	1st-4th	4	6 credits	Written exam	90 - 150 min	German
IN0008	Fundamentals of Databases	Elective	3 L + 1 E	1st-4th	4	6 credits	Written exam	90 - 150 min	German
IN0003	Introduction to Informatics 2	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam	75 -125 min	German
IN0012	Bachelor Practical Course	Elective	6 IN	1st-4th		10 credits	Project Work	English	German/ English
IN2032	Electronic Publishing / Document Engineering and the World-Wide Web	Elective	3 L + 1 E	1st-4th	4	5 credits	Written exam	75 -125 min	German
IN2111	3D User Interfaces	Elective	2 L + 2 E	1st-4th	5	6 credits	Written exam	90 - 150 min	English
IN2113	Programming Languages	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam	75 -125 min	German/ English
IN2209	IT Security	Elective	3 L + 1 E	1st-4th	4	5 credits	Written exam	75 -125 min	German
IN8009	Algorithms and Data Structures (ET/IT)	Elective	4 L + 2 E	1st-4th	6	5 credits	Written exam	75 -125 min	German

No.	Module name	Module type	Format	Sem.	Hrs/wk	Credits	Exam type Weighting fact	Exam duration	Language of instruction
Advanced Informatics (major)									
IN0010	Introduction to Computer Networking and	Elective	3 L + 2 E	1st-4th	5	6 credits	Written exam	90 - 150 min	German
IN2003	Efficient Algorithms and Data Structures	Elective	4 L + 2 E	1st-4th	6	8 credits	Written exam	120 - 180 min	English
IN2028	Business Analytics	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam	75 min	English
IN2030	Data Mining and Knowledge Discovery	Elective	2 L	1st-4th	2	3 credits	Written exam	60 - 75 min	English
IN2031	Application and Implementation of Database Systems	Elective	3 L + 2 E	1st-4th	5	6 credits	Written exam	90 - 150 min	German
IN2040	Virtual Machines	Elective	3 L + 2 E	1st-4th	5	6 credits	Written exam	90 - 150 min	English
IN2062	Techniques in Artificial Intelligence	Elective	3 L + 1 E	1st-4th	4	5 credits	Written exam	75 - 125 min	German/ English
IN2067	Robotics	Elective	3 L + 2 E	1st-4th	5	6 credits	Written exam	90 - 150 min	English
IN2076	Advanced Computer Architecture	Elective	4 L	1st-4th	4	6 credits	Written exam	90 - 150 min	English
IN2089	Strategic IT Management	Elective	2 S	1st-4th	2	3 credits	Written exam	60 - 75 min	German
IN2097	Advanced Computer Networking	Elective	3 L + 1 E	1st-4th	4	5 credits	Written exam	75 - 125 min	English
IN2101	Network Security	Elective	3 L + 1 E	1st-4th	4	5 credits	Written exam	75 - 125 min	English
IN2222	Cognitive Systems	Elective	3 L	1st-4th	4	5 credits	Written exam	75 - 125 min	English
IN2309	Advanced Topics of Software Engineering	Elective	3 L + 3 E	1st-4th	6	8 credits	Written exam	100 - 180 min	German/ English

## Chemistry

Depending on prior knowledge, students may choose basic modules or advanced modules in chemistry.

In the outcomes-based catalog Basic Modules (minor) 18 credits must be successfully earned from the required courses and 12 credits from the electives.

In the outcomes-based catalog Advanced Modules (major) 30 credits must be successfully earned from the electives. This sample elective catalog is continuously updated. The most current catalog is made available by the School of Management at the appropriate time and in the appropriate manner before classes begin.

Any student who has already successfully completed courses in the engineering / natural sciences subject Chemistry during a Bachelor's program may only select from the advanced courses (major) in Chemistry.

No.	Module name	Module type	Format	Sem.	Hrs/wk	Credits	Exam type, Weighting factor	Exam duration	Language of Instruction
	Chemistry Basic Modules (Minor)								
CH6202	General and Inorganic Chemistry	Required	2 L + 2 E	1st	4	6 credits	Written exam	90 min	German
CH1090	Introduction to Organic Chemistry	Required	2 L + 2 E	2nd	4	6 credits	Written exam	90 min	German
CH1091	Basic Principles of Physical Chemistry 1	Required	2 L + 2 E	3rd	4	6 credits	Written exam	90 min	German
CH0106	Biology for Chemists	Elective	2 L + 1 E	2nd/4th	3	6 credits	Written exam	90 min	German
CH1123	Chemical Engineering for TUM-BWL	Elective	4 L	2nd/4th	4	6 credits	Written exam	120 min	German
CH0107	Analytical Chemistry	Elective	2 L	2nd/4th	2	3 credits	Written exam	90 min	German
CH0999	Chemical Software and Databases for TUM-BWL	Elective	1 L + 1 E	2nd/4th	2	3 credits	Written exam	60 min	German
CH5143	Construction Chemicals I	Elective	2 L	1st/3rd	2	4 credits	Written exam	90 min	German
CH5104	The Chemical Industry	Elective	2 L	2nd/4th	2	4 credits	Written exam	90 min	German
CH0124	Toxicology and Legal Studies for Chemists	Elective	2 L	2nd/4th	2	3 credits	Written exam	90 min	German
CH4107	Inorganic Solid State and Organometallic Chemistry	Elective	2 L + 2 E	1st/3rd		5 credits	Written exam	90 min	German
CH4103	Molecular Inorganic Chemistry	Elective	2 L + 2 E	2nd/4th		5 credits	Written exam	90 min	German
CH0116	Biochemistry	Elective	2 L	1st/3rd	2	3 credits	Written exam	90 min	German
CH0867	Food Chemistry I (for BBB)	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German

No.	Module name	Module type	Format	Sem.	Hrs/wk	Credits	Exam type Weighting factor	Exam duration	Language of Instruction
	Chemistry Advanced Modules (Major)								
CH4107	Inorganic Solid State and Organometallic Chemistry	Elective	2 L + 2 E	1st/3rd		5 credits	Written exam	90 min	German
CH5143	Construction Chemicals I	Elective	2 L	1st/3rd	2	4 credits	Written exam	90 min	German
CH4103	Molecular Inorganic Chemistry	Elective	3 L + 1 E	2nd/4th	4	5 credits	Written exam	90 min	German
CH1019	Laboratory Course Chemical Engineering	Elective	3 IN	2nd/4th	3	3 credits	Lab activity	n/a	German
CH5104	The Chemical Industry	Elective	2 L	2nd/4th	2	4 credits	Written exam	90 min	German
CH0124	Toxicology and Legal Studies for Chemists	Elective	2 L	2nd/4th	2	3 credits	Written exam	90 min	German
CH0116	Biochemistry	Elective	2 L + 1 E	1st/3rd	3	4 credits	Written exam	90 min	German
CH6204	Material Flows in Industry and Nature	Elective	2 L	2nd/4th	2	3 credits	Project Work	n/a	German
CH4115	Methods of structural analysis in analytical chemistry	Elective	4 L	1st/3rd	4	5 credits	Written exam	90 min	German
CH5145	Silicon-organic Materials in Construction Technology	Elective	2 L	1st/3rd	2	4 credits	Written exam	90 min	German
CH1062	Hydrochemistry I	Elective	2 L	1st/3rd	2	3 credits	Written exam	90 min	German
CH5142	Food Chemistry II	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	German
CH0233	Nanomaterials	Elective	2 L	2nd/4th	2	4 credits	Written exam	90 min	German
CH0236	Molecular Medicine	Elective	2 L	1st/3rd	2	4 credits	Written exam	90 min	German
CH5115	Molecular Biotechnology	Elective	2 L	2nd/4th	2	4 credits	Written exam	90 min	German
CH0867	Food Chemistry I (for BBB)	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	90 min	German
CH0216	Industrial Chemical Processes II - Petrochemical Processes	Elective	2 L	2nd/4th	2	3 credits	Written exam	90 min	German
CH0211	Industrial Chemical Processes I - Refining	Elective	2 L	1st/3rd	2	3 credits	Written exam	90 min	German
CH0217	High Performance Polymers	Elective	2 L	2nd/4th	2	3 credits	Written exam	90 min	German
CH5163	Pharmaceutical Radiochemistry I	Elective	2 L	1st/3rd	2	3 credits	Written exam	90 min	German
CH5164	Pharmaceutical Radiochemistry II	Elective	2 L	2nd/4th	2	3 credits	Written exam	90 min	German
CH51083	Industrial Relevant Activation of Small Molecules	Elective	2 L	1st/3rd	3	4 credits	Written exam	90 min	German
CH0115	Reactivity of Organic Compounds	Elective	2 L + 2 E	1st/3rd	4	6 credits	Written exam	90 min	German

## Electrical Engineering and Information Technology

Depending on prior knowledge, students may choose basic modules or advanced modules in electrical engineering and information technology.

In the outcomes-based catalog Basic Modules (Minor) at least 10 credits must be successfully earned from Elective Category 1 and at least 20 credits from Elective Category 2.

In the outcomes-based catalog Advanced Modules (major) 30 credits must be successfully earned from the electives. This sample elective catalog is continuously updated. The most current catalog is made available by the School of Management at the appropriate time and in the appropriate manner before classes begin.

Any student who has already successfully completed courses in the engineering / natural sciences subject Electrical Engineering and Information Technology during a Bachelor's program may only select from the advanced courses (major) in Electrical Engineering and Information Technology.

No.	Module name	Module type	Format	Sem.	Hrs/wk	Credits	Exam type	Exam duration	Language of Instruction
	Electrical Engineering and Information Technology								
	Basic Module (Minor)								
	Elective Category 1								
EI2982	Principles of Information Engineering	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	75 min	German/English
EI3171	Principles in Electrical Engineering	Elective	2 L + 1 E	1st/3rd	3	6 credits	Written exam	90 min	English
EI1289	Electrical Engineering	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	German
	Elective Category 2								
EI3198	Analog Electronics	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	English
EI2986	Communications Engineering I - Signal Representation	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	75 min	German/English
EI0625	Communication Networks	Elective	3 L + 1 E	1st/3rd	4	5 credits	Written exam	90 min	German/English
EI3199	Laboratory Analog Electronics for TUM-BWL	Elective	4 IN	1st/3rd	4	5 credits	Written exam	90 min	German/English
EI0638	Renewable Energies	Elective	3 L + 1 E	2nd-4th	4	5 credits	Written exam	60 min	German/English
EI4802	Basics of High-Frequency Engineering	Elective	3 L + 1 E	2nd-4th	4	5 credits	Written or oral exam	60 min or 30 min	German/English
EI2988	Communications Engineering II - Modulation Methods	Elective	2 L + 1 E	2nd-4th	3	5 credits	Written exam	40 min	German/English
EI1286	Power Engineering Plants	Elective	2 L + 1 E	2nd-4th	3	5 credits	Written exam	30 min	German/English
EI0555	Internet Communication	Elective	2 L + 2 E	2nd-4th	4	5 credits	Oral exam	45 min	German/English
EI0644	Photovoltaic Stand Alone Systems	Elective	3 L + 1 E	2nd-4th	4	5 credits	Written exam	60 min	German/English
EI0602	Audio Communication	Elective	2 L + 1 E	2nd-4th	4	5 credits	Oral exam	30 min	German/English
EI0636	Nanoelectronics	Elective	2 L + 2 E + 2 IN	1st-4th	5	5 credits	Written exam	60 min	English

No.	Module name	Module type	Format	Sem.	Hrs/wk	Credits	Exam type	Exam duration	Language of instruction
	Advanced Modules in Electrical Engineering and Information Technology (Major)								
EI4585	Multimedia Laboratory	Elective	4 IN	1st/3rd	4	6 credits	Project work	30 min	German
EI7267	Nanotechnology for Energy Systems	Elective	2 L + 1 E + 2 IN	2nd/4th	5	5 credits	n/a	n/a	English
EI4585	Project: Economic Aspects of Nanotechnology	Elective	4 IN	1st/3rd	4	5 credits	Oral exam	30 min	German
EI0631	Media Technology	Elective	2 L + 2 E	1st/3rd <sup>1</sup>	4	5 credits	Written exam	90 min	German
EI7585	Clinical Applications of Computational Medicine	Elective	2 L	2nd/4th	2	6 credits	Project work	30 min	English
EI7331	Algorithm for Digital Circuit Design	Elective	2 L	2nd/4th	2	5 credits	Written exam	60 min	German
EI4544	Project Course Nanoelectronics and Nanotechnology	Elective	4 IN	2nd/4th	4	6 credits	Project work	n/a	German
EI7267	Nanotechnology for Energy Systems	Elective	2 L + 2 E	2nd/4th	4	5 credits	Written exam +presentation	45 min	English
EI0622	Semiconductor Sensors	Elective	3 L + 1 E	2nd/4th	4	5 credits	Written exam	60 min	German
EI0560	Physical Electronics	Elective	2 L + 1 E	2nd/4th	3	3 credits	Written exam	60 min	English
EI7387	Technical Acoustics and Noise Abatement	Elective	2 L + 1 E	1st/3rd	3	5 credits	Oral exam	n/a	German
EI7355	Nanosystems	Elective	4 L	1st/3rd	4	5 credits	Written exam +presentation	30 min	English
EI7624	Techno-Economic Analysis of Telecommunication Networks	Elective	2 L + 2 E	1st/3rd	4	5 credits	Written exam +presentation	60 min	English

No.	Module name	Module type	Format	Sem.	Hrs/wk	Credits	Exam type	Exam duration	Language of instruction
	Advanced Module in EI – Energy Technology (Major)								
EI7135	Industrial Energy Economy	Elective	2 L	1st/3rd	2	3 credits	Written exam	60 min	German
EI0611	Basics of Electrical Energy Storage	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	60 min	German
EI0620	Fundamentals of Electrical Machines	Elective	2 L + 2 E	1st/3rd	4	5 credits	Written exam	90 min	German
EI7327	Electrical Road Vehicles	Elective	2 L + 2 E	2nd/4th	4	5 credits	Written exam	60 min	German
EI7513	Ecomanagement and Life Cycle Analysis	Elective	2 L	2nd/4th	2	3 credits	Written exam	60 min	German
EI0610	Electrical Drives - Fundamentals and Applications	Elective	2 L + 1 E	2nd/4th	3	5 credits	Written exam	90 min	German
EI0628	Power Electronics – Fundamentals and Application	Elective	2 L + 1 E	2nd/4th	3	3 credits	Written exam	90 min	German
EI7500	Railway Systems and Their Economical	Elective	2 L	2nd/4th	2	3 credits	Oral exam	45 min	German
EI7328	Electromagnetic Compatibility in the Field of Power Engineering	Elective	3 L + 1 E	2nd/4th	4	5 credits	Oral exam	30 min	German
EI1291	Transmission of Electrical Energy - High Voltage Engineering	Elective	2 L + 1 E	3.	3	5 credits	Written or oral exam	30 min	German
EI1287	Laboratory Course Power Transmission and High Voltage Technology	Elective	4 IN	4.	4	5 credits	Lab activity	n/a	German
EI7329	Energy Application Technology	Elective	3 L + 1 E	1st/3rd	4	5 credits	Written exam	60 min	German
EI0673	Power Supply of Mobile Devices	Elective	3 L + 1 E	1st/3rd	4	5 credits	Written exam	60 min	German
EI7267	Nanotechnology for Energy Systems	Elective	2 L + 2 E	2nd/4th	4	5 credits	Written exam	45 min	English
EI0612	Electrical Small Power Machines	Elective	2 L + 1 E	1st/3rd	3	5 credits	Written exam	60 min	German
EI4585	Project: Economic Aspects of Nanotechnology	Elective	4 IN	1st/3rd	4	5 credits	Oral exam	30 min	German
EI7624	Techno-Economic Analysis of Telecommunication Networks	Elective	2 L + 2 E	1st/3rd	4	5 credits	Written exam	60 min	English
EI8029	Energy Systems & Energy Economy	Elective	2 L + 2 E	1st/3rd	4	5 credits	Written exam	60 min	English

## Computer Engineering

Depending on prior knowledge, students may choose basic modules or advanced modules in Computer Engineering.

Within the selected outcomes-based module catalog, at least 30 credits of electives must be successfully earned. This sample elective catalog is continuously updated. The most current catalog is made available by the School of Management at the appropriate time and in the appropriate manner before classes begin.

Any student who has already successfully completed courses in the engineering / natural sciences subject Computer Engineering during a Bachelor's program may only select from the advanced courses (major) in Computer Engineering.

No.	Module name	Module type	Format	Sem.*	Hrs/wk	Credits	Exam type	Exam duration	Language of instruction
	Computer Engineering Basic Modules (Minor)								
IN8005	Introduction to Computer Science (for non-Informatics studies)	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam	90 - 150 min	German
IN8024	Information Management for Digital Business Models	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam	90 - 150 min	German/English
IN0012	Bachelor Practical Course	Elective	6 IN	1st-4th	6	10 credits	Project Work	n/a	German/English
IN2111	3D User Interfaces	Elective	2 L + 2 E	1st-4th	5	6 credits	Written exam	90 - 150 min	English
IN2113	Programming Languages	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam	75 - 125 min	German/English
New	Principles of Information Engineering	Elective	2 L + 1 E	1st-4th	3	5 credits	Written exam	75 min	English
EI3171	Principles in Electrotechnology	Elective	2 L + 1 E	1st-4th	3	6 credits	Written exam	90 min	English
EI3198	Analog Electronics	Elective	2 L + 1 E	1st-4th	3	5 credits	Written exam	90 min	English

No.	Module name	Module type	Format	Sem.*	Hrs/wk	Credits	Exam type Weighting factor	Exam duration	Language of instruction
	Advanced Modules in Computer Engineering (Major)								
IN2030	Data Mining and Knowledge Discovery	Elective	2 L	1st-4th	2	3 credits	Written exam	60-75 min	English
IN2062	Fundamentals of Artificial Intelligence	Elective	3 L + 1 E	1st-4th	4	5 credits	Written exam	75-125 min	German/English
IN2067	Robotics	Elective	3 L + 2 E	1st-4th	5	6 credits	Written exam	90 - 150 min	English
IN2222	Technical Cognitive Systems	Elective	3 L	1st-4th	4	5 credits	Written exam	75 - 125 min	English
IN2309	Advanced Topics of Software Engineering	Elective	3 L + 3 E	1st-4th	6	8 credits	Written exam	100 - 180 min	German/English
EI0697	Mobile Communications	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam	90 min	English
EI0636	Nanoelectronics	Elective	2 L + 2 E +2 IN	1st-4th	5	5 credits	Written exam	60 min	English
EI0703	<u>Programming in C++ for Socio Technical Systems</u>	Elective	2 L + 2 IN	1st-4th	4	6 credits	Written exam + homework 7:3	120 min	English
EI0667	Real-Time and Embedded Systems	Elective	3 L + 1 E	1st-4th	4	6 credits	Written exam	90 min	English
EI7006	Statistical Signal Processing	Elective	3 L + 1 E	1st-4th	4	6 credits	Written exam	90 min	English



EI5064	Real-Time Programming Languages	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam + homework 3:2	60 min	English
EI73141	Brain, Mind and Cognition (Seminar)	Elective	2 L	1st-4th	2	5 credits	Oral exam + homework 2:3	n/a	English
EI7480	Data-Driven Innovation	Elective	2 L + 1 E	1st-4th	3	5 credits	Written exam, project work + homework 3:5:2	60 min	English
EI7581	Inside My iPhone – Technology Analysis of a Smart Phone	Elective	2 L + 2 E + 3 IN	1st-4th	7	6 credits	Scientific paper	n/a	English
EI7352	Multimedia Communications	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam + homework 7:3	90 min	English
EI7624	Techno-Economic Analysis of Telecommunication Networks	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam + project work 3:2	60 min	English
EI7621	Topics in Multimedia Signal Processing	Elective	2 L + 2 E	1st-4th	4	5 credits	Homework	n/a	English

## Industrial Engineering

Within the selected module catalog, at least 30 credits of electives must be successfully earned. This sample elective catalog is continuously updated. The most current catalog is made available by the School of Management at the appropriate time and in the appropriate manner before classes begin.

Modules from the electives catalog Industrial Engineering (Minor) cannot be simultaneously applied to Advanced OSCM.

No.	Module name	Modularity	Format	Sem.*	Hrs/wk	Credits	Exam type	Weighting factor	Exam duration	Language of instruction
	<b>Industrial Engineering+ Basic Modules (Minor)</b>									
WI000977	Stochastic Modeling and Optimization	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam		90 min	English
WI000979	Inventory Management	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam		90 min	English
WI000819	Discrete Optimization	Elective	2 L + 2 E	1st-4th	4	6 credits	Written exam, presentati		120 min	English
WI100967	Designing and Scheduling Lean Manufacturing Systems	Elective	2 L + 2 E	1st-4th	4	6 credits	2 partial exams 1:1		60 min + 60 min	English
WI200541	Planning and Scheduling of Complex Operations: Models, Methods and Applications	Elective	4 S	1st-4th	4	6 credits	Written exam + exercise 1:1		60 min	English
WIB19823	Advanced Topics in Operations & Supply Chain Management	Elective	4 S	1st-4th	4	6 credits	Scientific paper		n/a	German/English
IN2028	Business Analytics	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam		75 min	English
IN2211	Auction Theory and Market Design	Elective	2 L + 2 E	1st-4th	4	5 credits	Written exam		75 min	English

MA4800	Foundations of Data Analysis	Elective	4 L + 2 E	1st-4th	6	8 credits	Written exam	90 min	English
MW0124	Systems Engineering	Elective	2 L + 1 E	1st-4th	3	5 credits	Written exam	90 min	German/English

## Management-technical Elective

Within the framework of the management-technical elective, students earn a total of 30 credits in a management or technical subject area.

In the management-technical elective, students are free to take all classes in advanced economics at the master level, as well as all technical elective modules of the Master's program in Management & Technology. Instead of performing examinations at TUM, students can enroll in a foreign exchange program to earn up to 30 credits at a foreign university. To set up such a program, the student is required to work with a mentor assigned by the faculty in order to configure a semester plan that needs to be approved no later than three weeks prior to taking an examination. The corresponding courses are to be selected from the catalog of the foreign university.

The elective catalog will be announced by the School of Management in a suitable and timely manner before the courses begin.

Any student who has already successfully completed basic modules in the engineering / natural sciences during a Bachelor's program may not retake these in the Master's program Management & Technology.

No.	Module description	Module type	Format	Sem.*	Hrs/wk	Credits	Exam type	Exam duration	Language of Instruction
	Project Studies								
WI900684	Project Studies	Elective		1st-4th	8	12 credits	Project work	n/a	German/English

## Master's Thesis

	Master's Thesis								
	Master's Thesis					30 credits			German/English

### Key to abbreviations:

Sem. = Semester; Hrs/wk = Hours per week; L = lecture; E = exercises; IN = internship; S = seminar. The column for exam duration indicates the number of minutes required for a written exam.

### Notes:

\* Recommended semester in conjunction with the corresponding selected management specialization and the engineering / natural sciences subject.

### III. Curriculum – Tailored to the corresponding technology subject

	Technical EI minor	Technical CH minor	All other technical minors	All technical majors
<b>1. Semester (WS)</b>				
Specialization in Management	12	12	12	12
Specialization in Technology	5	6	12	12
Electives in Management and Technology	13	12	6	6
<b>Total credits</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>
<b>2. Semester (SS)</b>				
Specialization in Management	12	12	12	12
Specialization in Technology	5	18	12	12
Electives in Management and Technology	12	0	6	6
<b>Total credits</b>	<b>29</b>	<b>30</b>	<b>30</b>	<b>30</b>
<b>3. Semester (WS)</b>				
Specialization in Management	6	6	6	6
Specialization in Technology	20	6	6	6
Electives in Management and Technology	5	18	18	18
<b>Total credits</b>	<b>31</b>	<b>30</b>	<b>30</b>	<b>30</b>
<b>4. Semester (SS)</b>				
Master's Thesis	30	30	30	30
<b>Total credits</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>

## **APPENDIX 2: Aptitude Assessment Procedure**

### **Aptitude assessment for the Master's program Management and Technology (TUM-BWL) at the Technical University of Munich**

#### **1. Objective of the procedure**

<sup>1</sup>Besides the requirements in § 36 (1) Nos. 1 and 2, qualification for the Master's program in Management and Technology (TUM-BWL) requires proof of aptitude in accordance with § 36 (1) No. 3 in accordance with the following rules. <sup>2</sup>The special qualifications and skills of the applicant should be appropriate to an economist with competencies in engineering / natural sciences.

<sup>3</sup>Individual aptitude parameters are:

- 1.1 existing technical knowledge (incl. success) from the original degree program in the area of business with a relationship to engineering or natural sciences based on the Bachelor's program Management and Technology at the Technical University of Munich;
- 1.2 knowledge of issues involving management and technology;
- 1.3 ability to work in a scientific manner based on appropriate principles and methods;
- 1.4 skills in the language of engineering / natural sciences and management (in German and English);
- 1.5 remarkable motivation (indicated, for example, by completing a commercial apprenticeship, practical experience during studies, study abroad, work-study experience, or social engagement); and
- 1.6 reflection about one's own abilities and special talents within the context of a program combining management and engineering or natural sciences.

#### **2. Procedures for assessing aptitude**

- 2.1 Procedures for assessing aptitude are performed every six months by the School of Management.
- 2.2<sup>1</sup> Applications for admission to the aptitude assessment at the Technical University of Munich are to be placed together with the documents indicated in Nos. 2.3.1 to and including 2.3.5 as well as § 36 (1) No. 2 by May 31 for the winter semester and by November 30 for the summer semester (cut-off period). <sup>2</sup>The diploma and the certificate as proof of completion of the Bachelor's program must be presented to the matriculation office at the Technical University of Munich within five weeks after the start of classes. <sup>3</sup>Otherwise acceptance to the Master's program in accordance with § 36 FPSO is not possible.
- 2.3 The following must be included in the application:
  - 2.3.1 a transcript of records with modules totaling at least 140 credits; the transcript of records must be issued from the authorized examination office or the authorized registrar's office;
  - 2.3.2 a curricular analysis derived from the transcript of records must be completed in the online application procedure and a printout must be included with the application materials;
  - 2.3.3 a curriculum vitae in tabular form;
  - 2.3.4 if applicable, proof of the nature and duration of international experience gained in conjunction with the original degree program or having taken place a maximum of three years before commencing the original degree program following the successful completion of a university placement exam; international experience can be demonstrated, for example, by providing proof of studies in a foreign country of at least 60 calendar days, an internship in a foreign country of at least 60 calendar days, other foreign stays of at least 60 calendar days that are not simply attendance at a language course (e.g. participation in a work-and-travel program or au pair work) or summer/winter

school abroad of at least 3 ECTS, or other international experience consistent with the International Experience module of the TUM-BWL Bachelor's program;

if necessary, proof should be included with attachments; and

2.3.5 if applicable, proof of a GMAT score or at least 600 points.

### 3. Aptitude Assessment Commission

3.1 <sup>1</sup>The aptitude assessment is performed by a commission for the Master's program in Management and Technology (TUM-BWL) that normally includes the dean, at least two professors and at least one academic employee. <sup>2</sup>At least half of the members of the commission must be university professors. <sup>3</sup>A student representative works with the commission in an advisory position.

3.2 <sup>1</sup>The members are selected by the faculty council in consultation with the dean. <sup>2</sup>At least one professor is selected as a deputy member of the commission. <sup>3</sup>The head of the commission is normally the dean. <sup>4</sup>The course of business is governed by Art. 41 BayHSchG in the latest valid version.

### 4. Admission to the aptitude assessment

4.1 Admission to the aptitude assessment requires that the documents listed in No. 2.3 are presented completely and on time.

4.2 Whether the requirements have been met is checked by the procedure according to No. 5.

4.3 Those who are not admitted will receive a letter of rejection with notification of legal rights.

### 5. Performing the aptitude assessment

#### 5.1 First stage in the execution of the aptitude assessment

5.1.1 <sup>1</sup>The commission uses the written application documents required by No. 2.3 to assess whether applicant has the aptitude for the program according to No. 1 (first stage of the execution of the aptitude assessment procedure). <sup>2</sup>The commission evaluates the submitted documents on a scale from 0 to 80 points, whereby 0 is the worse and 80 the best possible result. <sup>3</sup>Negative points are not assigned.

The following criteria are used:

#### a) **Technical qualifications**

<sup>1</sup>The curricular analysis is not made with a schematic comparison of modules, but on the basis of competencies. <sup>2</sup>It is based on the elementary core module groups of the Bachelor's program Management and Technology at the Technological University of Munich as listed in the following table.

Core module groups	Score (points)
Management modules of at least 25 ECTS	20
Technical principles in the area of empirical methods of at least 6 ECTS	10

Technical principles in the area of quantitative decision making with methods of operations research of at least 6 ECTS	10
Economics modules of at least 5 ECTS	10
Total	50

<sup>3</sup>If it is determined that there is no essential difference between the gained competencies (learning results), a maximum of 50 points are granted. <sup>4</sup>If this value is not a whole number, it will be rounded up. <sup>5</sup>Competencies that are not proven are assigned 0 points for the corresponding group type.

### b) Final grade

<sup>1</sup>For every two tenths of a grade where the calculated average grade for examinations is better than 3.0 for 140 credits, the applicant receives one point.

<sup>2</sup>The maximum point total is 10. <sup>3</sup>For foreign degrees, the Bavarian formula is used to convert the grades. <sup>4</sup>If at the time of application a degree certificate with more than 140 credits is presented, the evaluation shall be based on the modules with the best grades over a total of 140 credits. <sup>5</sup>The applicant must list these with the application and guarantee the correctness of the details in writing.

<sup>6</sup>The average is calculated from the graded module examinations over a total of 140 credits. <sup>7</sup>The cumulative grade average is calculated as a weighted grade average for the module. <sup>8</sup>The grade weights of the individual modules correspond to the credits assigned to each module.

### c) International experience

<sup>1</sup>Documented international experience, which is as part of the initial degree program or in conjunction with the initial degree program, or begun no more than three years before starting the initial degree program after passing a university placement exam, is evaluated as follows:

Nature of the international experience	Possible points
Studies abroad of at least 60 calendar days*	10
Internship abroad of at least 60 calendar days*	10
Other foreign stays of at least 60 calendar days,* which are not simply attendance at a language course (e.g. participation in work-travel program or work as an au pair)	10
Summer/winter school abroad of at least 3 ECTS	10
Other international experience in the original degree program consistent with the nature of the International Experience module of the TUM-BWL Bachelor's program	10

\*Important is the duration of the related stay abroad.

<sup>2</sup>If the applicant provides documentation of several international experiences, only one will be used in the aptitude assessment procedure; it is not possible to combine several experiences abroad. <sup>3</sup>The maximum number of points is 10.



#### d) **GMAT score**

Documentation of a GMAT score of at least 600 points is assigned 10 points.

- 5.1.1 The point total for Stage 1 is the sum of the individual assessments in 5.1.1 a) to 5.1.1 d).
- 5.1.2 <sup>1</sup>Those applicants who have achieved at least 61 points will receive a confirmation of the passed aptitude assessment. <sup>2</sup>If it is determined that specific technical prerequisites have not been achieved in the initial degree program, the commission can add a condition to the aptitude assessment that basic examinations from the Bachelor's program Management and Technology be taken for a maximum of 30 credits. <sup>3</sup>These basic examinations must be successfully completed in the first year of studies. <sup>4</sup>Within this time constraint, basic examinations may only be repeated once at the next examination date. <sup>5</sup>The Examination Committee can choose to make admission to individual module examinations dependent on the passing of the basic examination.
- 5.1.4 <sup>1</sup>Unsuitable applicants with total points of 50 or less will receive a rejection letter with the reasons and a notice of their legal rights, which is to be signed by the head of the university. <sup>2</sup>Signature authorization may be delegated.
- 5.2. Second stage in the execution of the aptitude assessment
- Admissions interview**
- 5.2.1 <sup>1</sup>The remaining applicants will be invited to a selection interview.<sup>2</sup>In the second stage of the aptitude assessment procedure, the qualifications from the first degree and the results of the interview are assessed, whereby the qualifications gained in the first degree are to be given at least the same priority. <sup>3</sup>If the number of points determined in No. 5.1.3 Line 1 has not been achieved, this provision also applies to applicants who have been assigned a special condition in accordance with No. 5.1.3 Line 2. <sup>4</sup>The scheduled appointment for the admissions interview will be announced at least one week in advance. <sup>5</sup>The general time frame for scheduling admissions interviews must be determined before the application deadline. <sup>6</sup>The applicant shall adhere to the set date for the interview. <sup>7</sup>An applicant who is unable to attend an interview for reasons that are beyond his or her control can petition with justification for a new date no later than two weeks before classes start. <sup>8</sup>Failure to appear to the scheduled interview date that is not justified is cause for rejection.
- 5.1.3 <sup>1</sup>The admissions interview is to be held separately for each applicant. <sup>2</sup>The meeting will last from at least 20 minutes to a maximum of 30 minutes for each applicant. <sup>3</sup>The content of the interview shall cover the following topics.
1. Reflection on one's own competencies and special talents within the context of an interdisciplinary program that combines economics and engineering or natural sciences,
  2. Knowledge of economic-technical issues,
  3. Skills in the language of engineering / natural sciences and economics (in German and English). <sup>4</sup>The matter may also involve the documents submitted pursuant to 2.3. <sup>5</sup>Specialized knowledge that is first addressed during the Master's program for Management and Technology (TUM-BWL) is not considered. <sup>6</sup>With the agreement of the applicant, a member of the student body can be admitted to observe.
- 5.2.3 <sup>1</sup>The admissions interview will be conducted by at least two members of the commission. <sup>2</sup>Each of the commission members independently evaluates the three main categories. <sup>3</sup>For each of these, each of the members shall assign points between 0 and 10, with 0 being the lowest and 10 the highest and best result. <sup>4</sup>The three main categories are weighted as follows:

1. reflection about one's own competencies and talents within the context of an interdisciplinary program that combines economics and engineering or natural sciences,
2. knowledge of economic-technical issues; and
3. technical language skills.

<sup>5</sup> The points from each commission member result from the sum of the weighted evaluations of the individual categories. <sup>6</sup>The overall evaluation is the result of the arithmetic mean of the evaluations of the two commissioners whereby the total is rounded up. <sup>7</sup>The maximum point total is 60.

- 5.2.4 <sup>1</sup>The total points from the second stage is the total of the points from 5.2.3 and the points from 5.1.1 a) (technical qualification) as well as the points from 5.1.1 b) (grade).  
<sup>2</sup>Anyone with 81 points or more is assessed as suitable.
- 5.2.5 <sup>1</sup>The commission's results of the aptitude assessment procedure will be communicated in writing, including, if applicable, any special conditions already determined from Stage 1 in accordance with No. 5.1.3. <sup>2</sup>The response is to be signed by the university administration. <sup>3</sup>Signature authorization may be delegated. <sup>4</sup>A rejection letter is to be combined with a justification and notification of legal rights.
- 5.2.6 Admission to the Master's program Management and Technology (TUM-BWL) applies to all subsequent applications in this degree program.

## 6. Minutes

<sup>1</sup>Minutes of the aptitude assessment procedure are to be kept, with the date, duration and location of the aptitude assessment, the names of the members of the commission, the name of the applicant and the evaluation of the commission members as well as the final total result. <sup>2</sup>The minutes must show the essential reasons and the topics of the interview with the applicants; the essential reasons and subjects can be in bullet points.

## 7. Repeating the aptitude assessment

If an applicant does not have the required qualification for the Master's program in Management and Technology (TUM-BWL), he or she can repeat the application for the aptitude assessment once.