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Technische Universität Dresden  
Faculty of Mathematics

## **Examination Regulations for the consecutive Master's degree program Technomathematics**

as of March 30, 2023  
(translated version)

On the basis of § 34 para. 1 sentence 1 of the Act on the Autonomy of Institutions of Higher Education in the Free State of Saxony in the version published on January 15, 2013 (SächsGVBl. p. 3), Technische Universität Dresden issues the following Examination Regulations as statutes.

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## **Part 1: General regulations**

### **§ 1**

#### **Standard period of study**

The standard period of study for the degree program includes on-site attendance, self-study, in some cases supervised practice periods, and the final examination.

### **§ 2**

#### **Degree program and examination structure**

(1) The program is divided into modules and is concluded with the final examination. The final examination in Bachelor's degree programs is the Bachelor's examination, in Master's degree programs the Master's examination, and in *Diplom* degree programs the *Diplom* examination.

(2) The final examination consists of module examinations as well as the final thesis and, if required in part 2: "Subject-specific regulations", the colloquium. A module is concluded by a module examination, which consists of at least one examined assessment. Examined assessments are accomplished throughout the program. The final thesis in Bachelor's degree programs is the Bachelor's thesis, in Master's degree programs the Master's thesis, and in *Diplom* degree programs the *Diplom* thesis.

(3) The required examined assessments in the modules and their type and structure are specified in the module descriptions. The subject matter of the examined assessment consists of the contents and skills acquired in the module, if not stated otherwise in the module descriptions.

(4) For the components of the final examination pursuant to para. 2 sentence 1, subject-specific admission requirements may be specified. In particular, coursework may be required as preliminary academic work for module examinations if this is exceptionally necessary to ensure that taking the examination is reasonable. Their number, type and design are to be regulated in the module descriptions, mere attendance is not deemed preliminary academic work. Additional subject-specific admission requirements may be specified in part 2: "Subject-specific regulations". If subject-specific admission requirements have been fulfilled in the form of elective compulsory modules, a later re-selection is feasible. Subject-specific admission requirements that would be fulfilled by a waiver pursuant to § 18 shall be deemed to have been fulfilled if the student makes a declaration to that effect.

(5) Students can take examinations in modules other than those covered by the final examination (additional modules). Optionally, these module examinations can be selected from the full range of modules offered at TU Dresden or a cooperating university after consultation with the examiner. They do not enter into the calculations of a student's workload nor of the overall grade.

### **§ 3**

#### **Deadlines and dates**

(1) The final examination shall be taken within the standard period of study. A final examination that has not been taken within four semesters following the standard period of study will be considered as failed. A failed final examination can be repeated once within one year. Following the expiration of this deadline, it is deemed as failed again. A second repeat examination is only possible the next time it is held, thereafter the final examination is deemed to be irrevocably failed.

(2) Module examinations shall be taken by the end of the semester stated in the study schedule.

(3) TU Dresden, through its Study Regulations and courses offered, ensures that study achievements and examined assessments as well as the final thesis and, if required, the colloquium can be completed within the specified periods of time. The dates of the required study achievements and examined assessments as well as the dates of issue and submission of the final thesis and, if required, the date of the colloquium will be announced in the usual manner.

#### **§ 4**

##### **General admission requirements and admission procedures**

(1) Students can only be admitted to the final examination pursuant to § 2 para. 2 sentence 1 if

1. they are enrolled in the degree program at TU Dresden, and
2. they have proven the subject-specific admission requirements, and
3. they have made a declaration regarding para. 4 no. 3 recorded in a data processing system.

(2) In order to submit or take examined assessments of the module examinations, students must register. Withdrawal is possible without giving reasons up to three working days before the examination date; the Examination Committee may, in consultation with the Academic Affairs Committee, determine a different date up to 14 days before the examination date at the earliest; this date must be announced at the beginning of the semester in the usual manner. The Examination Committee specifies the deadlines and procedures for registration and withdrawal, and publishes them at the beginning of each semester in the usual manner. The same applies to preliminary academic work.

(3) Admission is granted

1. to a module examination by the electronic examination administration system based on the automated verification of the admission requirements when the first registration for an examined assessment of this module examination is made,
2. to the final thesis by the chairperson of the Examination Committee on the basis of a student's request for issuance of the topic, or if § 26 para. 3 sentence 5 applies, upon issue of the topic, and
3. to the colloquium by the responsible Examination Office on the basis of the evaluation of the thesis with a grade of at least "pass" (4.0), provided that the final examination pursuant to § 2 para. 2 sentence 1 includes a colloquium.

(4) Admission is denied if

1. the requirements stated in para. 1 or the rules of procedure stated in para. 2 are not met, or
2. the documents are incomplete, or
3. the student has already irrevocably failed an examination required for the completion of the degree.

(5) Admission is refused by the Examination Committee.

#### **§ 5**

##### **Examined assessments**

(1) Examined assessments are

1. written examinations (§ 6),
2. term papers (§ 7),
3. oral examinations (§ 8),
4. complex assessments (§ 9),
5. portfolios (§ 10),
6. scientific-practical assessments (§ 11), and
7. language examinations (§ 12).

Examined assessments or individual tasks can be carried out according to the multiple-choice (MC) method if this is accounted for in the regulations applicable to the degree program. If examined assessments or individual tasks are carried out according to sentence 2, the student should demonstrate the knowledge and skills detailed in the qualification objective of the module.

(2) Studies and examinations must be completed in German or, if indicated by the module descriptions, in English. If, according to the module description, a module primarily serves to acquire foreign language qualifications or subject-specific qualification in a foreign language, studies and examined assessments may also have to be completed in the respective foreign language if required by the respective assignment. Upon a student's request, study achievements and examined assessments can also be taken in another language if the Examination Committee agrees to this in consultation with the examiner.

## **§ 6**

### **Written examinations**

(1) Written examinations are taken on-site and produce a "physical result" (*gegenständlich*), e.g. written piece of work.

(2) In written examinations, students prove that they are able to solve tasks and analyze topics drawing on the required knowledge and using the standard methods of the degree program with time constraints and with limited resources.

(3) The duration of the written examinations is specified in the module descriptions and shall be no less than 60 minutes and shall not exceed 240 minutes.

## **§ 7**

### **Term papers**

(1) Term papers are completed as non-attendance learning assignments, and produce a "physical result" (*gegenständlich*), e.g. written piece of work.

(2) Term papers are intended to demonstrate the student's competence in dealing with selected issues on the basis of specialist literature and other sources within a defined period of time, as well as to verify that fundamental techniques of scientific work can be applied. This includes the ability to work in a team, if required by the task at hand. Where indicated in the module descriptions, term papers also include the demonstration of the ability to coherently present and discuss aspects of the work at hand orally in accordance with the respective assignment (combined term paper).

(3) The time required for term papers is specified in each case in the module descriptions and must not exceed 300 hours. Derived from this, the deadline for submission is to be determined as part of the respective assignment.

(4) For oral individual assessments of combined term papers, § 8 para. 5 shall apply accordingly.

(5) If the term paper consists of teamwork, the individual contributions must be clearly identifiable and assessable and must meet the requirements set out in para. 2.

## § 8

### Oral examinations

(1) Oral examinations are taken on-site and do not produce a “physical result” (*nicht gegenständlich*). The focus is on what the student expresses.

(2) Oral examinations serve to provide the direct demonstration of linguistic and communicative competencies, in particular in the form of conversation, lecturing, presentation or discussion, of the specialist knowledge corresponding to the level of study and of the understanding of the contexts of the examined field. The respective task determines which of the skills are the focus of the examination.

(3) Oral examinations are conducted as group examinations with up to five persons or as individual examinations as specified in the module descriptions.

(4) The duration of the oral examinations is specified in the module descriptions and shall be no less than 15 minutes and shall not exceed 60 minutes per student. Group examinations may not exceed a total duration of 75 minutes.

(5) Oral examinations shall be taken in the presence of at least two examiners (colleague examination) or one examiner and one expert assessor (§ 24). The main points and results of the oral examination shall be recorded in a protocol.

(6) Oral examinations may be conducted with or without the public being admitted. For public oral examinations, listeners may be admitted if the facilities allow for it, unless one of the examiners objects. For oral examinations which are not open to the public, the Examination Committee in agreement with the examiners (in case of a colleague examination) or with the examiner (if there is only one examiner) may only admit a student who wishes to take the same examination at a later examination date (than the examined student) as a listener upon application by the student and if the facilities allow for it, unless the examined student objects. Procedures and the deadline for the application are specified by the Examination Committee and published in the usual manner. The module descriptions stipulate whether the oral examination is public or non-public. The deliberation and announcement of the examination results always take place without listeners.

## § 9

### Complex assessments

(1) Complex assessments can comprise on-site assessments and off-site assessments and can include written or other individual assessments involving a “physical result” (*gegenständlich*) as well as oral or other individual assessments not involving any “physical result” (*nicht gegenständlich*).

(2) Complex assessments serve to demonstrate the student's ability to develop, implement, and present concepts. The student shall demonstrate the competence to define goals for an overarching task and to develop solutions. This includes the ability to work in a team, if required by the task at hand.

(3) The time required for complex assessments is specified in each case in the module descriptions and must not exceed 450 hours. Derived from this, the deadline for the submission of individual assessments and the duration of individual assessments are to be determined as part of the respective assignment.

(4) For oral or other individual assessments not involving any “physical result”, § 8 para. 5 shall apply accordingly.

(5) If the complex assessment consists of teamwork, the individual contributions must be clearly identifiable and assessable and must meet the requirements set out in para. 2.

## **§ 10 Portfolios**

(1) Portfolios can comprise on-site and off-site assessments, and produce a “physical result” (*gegenständlich*), e.g. written piece of work.

(2) Portfolios serve to demonstrate, by means of a compilation of similar or disparate individual assessments, the student's ability to place the aspects of professional, scientific activity that are specified by the respective task in an overarching context. This includes the ability to work in a team, if required by the task at hand.

(3) The time required for the portfolios is specified in each case in the module descriptions and must not exceed 300 hours. Derived from this, the deadline for the submission of individual assessments, the duration of individual assessments, and the deadline for the submission of the complete portfolio are to be determined as part of the respective assignment.

(4) If the portfolio consists of teamwork, the individual contributions must be clearly identifiable and assessable and must meet the requirements set out in para. 2.

## **§ 11 Scientific-practical assessments**

(1) Scientific-practical assessments are taken on-site and do not produce a “physical result” (*nicht gegenständlich*). The focus is on the actions of the student.

(2) Scientific-practical assessments serve to demonstrate the ability to perform tasks in accordance with the requirements of the discipline.

(3) The duration of scientific-practical assessments is specified in the module descriptions and shall be no less than 15 minutes and shall not exceed 45 minutes.

(4) § 8 para. 5 shall apply accordingly.

## **§ 12 Language examinations**

(1) Language examinations are taken on-site and can include individual assessments involving a “physical result” (*gegenständlich*), e.g. a written assessment, as well as oral or other individual assessments not involving any “physical result” (*nicht gegenständlich*).

(2) Language examinations serve to demonstrate practical language skills.

(3) The duration of the language examinations is specified in the module descriptions and shall be no less than 15 minutes and shall not exceed 240 minutes. The ratio of written or other assessments involving a “physical result” and oral individual assessments is to be determined as part of the respective assignment.

(4) For oral or other individual assessments not involving any “physical result”, § 8 para. 5 shall apply accordingly.

## § 13

### Electronic examinations

(1) In principle, the examinations according to § 6 to § 12 can also be conducted, evaluated and assessed using digital technologies. Only those digital technologies may be used that correspond to the generally recognized state of the art at the time of use. Data protection regulations must be adhered to.

(2) Prior to an examination that uses digital technologies, two examiners in consultation with the Examination Committee must determine the suitability of these technologies with regard to the intended examination tasks and the conduct of the electronic examination. The examination using digital technologies will be announced in the usual manner by the beginning of the registration period.

(3) The authenticity of the student and the integrity of the examination results must be ensured. For this purpose, the examination results in the form of electronic data must be clearly identified and be unmistakably and permanently assigned to the student's name. It must be ensured that the electronic data for evaluation and verifiability remains unchanged and complete.

(4) An automatically generated assessment of an examination shall be reviewed by an examiner at the request of the examined student.

## § 14

### Students with a disability or chronic illnesses or with family responsibilities

(1) If a student proves that, due to an impairment or chronic illness, they are unable to accomplish an examined assessment in the stipulated form, they are entitled to compensation for disadvantages in the examination procedure if the relevant requirements are met. The student must submit an application to the Examination Committee to be granted compensation for a disadvantage, including the compensation sought, and must substantiate their request by the fulfillment of the requirements. For this purpose, the student may be required to submit a medical certificate and, in cases of doubt, an official medical certificate by a public health officer (*Amtsarzt*). The Examination Committee specifies the procedure and the deadline for the application and publishes them in the usual manner. If the Examination Committee identifies an entitlement pursuant to sentence 1, it shall decide on the granting of an appropriate compensation at its due discretion in consultation with the respective examiners. The Liaison Officers for Students with Disabilities and Chronic Illnesses, the Peer Counselor (ISL - *Interessenvertretung Selbstbestimmt Leben in Deutschland*)/Peer-to-Peer Advisor, and, if affected, the Studies for Blind and Visually Impaired Group may be consulted; in particularly difficult cases, they must be consulted. Suitable measures to compensate for disadvantages include the extension of the allotted time to complete the work, extended breaks, use of other media, use of other examination rooms within the university, another examination date, or taking an equivalent examined assessment in another form. If it is intended to deviate significantly from the requested compensatory measures, the student should be given the opportunity to comment before a decision is made.

(2) During pregnancy, after giving birth and while breastfeeding, the provisions of the Maternity Protection Act applicable to students shall apply. In particular, during the periods of maternity protection pursuant to § 3 of the Maternity Protection Act, no examination deadlines shall commence and they shall not be counted towards current examination deadlines; deadlines for the submission of (individual) off-site assessments as defined by § 9 para. 3 sentence 2 and § 10 para. 3 sentence 2 shall be extended. For the corresponding use of parental leave according to the Federal Parental Allowance and Parental Leave Act, students can take a leave of absence from their studies



pursuant to § 12 para. 2 of the Enrollment Regulations. During leave of absence, no examination deadlines shall commence and they shall not be counted towards current examination periods.

(3) If a student proves that, due to taking care of their own children until they reach the age of 14 or caring for close relatives, examinations cannot be taken as stipulated, the student may be granted appropriate compensation upon request (extended compensation for disadvantages). The Examination Committee decides on this request in consultation with the respective examiner. Para. 1 sentences 2 and 4 to 8 shall apply accordingly. Close relatives are children including children-in-law, adopted children and foster children as well as children, adopted or foster children of the spouse or partner, grandchildren, parents, parents-in-law, grandparents, siblings, spouses, life partners and partners in a consensual union.

(4) Para. 1 to 3 shall apply accordingly to preliminary academic work, the final thesis, and the colloquium, if required.

## § 15

### **Assessment of examined assessments, calculation and weighting of grades, publication of examination results**

(1) The grade of an individual examined assessment is decided by the responsible examiner. In case of a colleague examination, the examiners jointly decide on the grade. The following grades shall be used:

1 = very good	= an outstanding performance;
2 = good	= a performance considerably exceeding average requirements;
3 = satisfactory	= a performance that meets average requirements;
4 = pass	= a performance that meets the requirements despite some inadequacies;
5 = fail	= a performance that does not meet the requirements because of grave inadequacies.

For a more differentiated assessment, individual grades can be raised or lowered by 0.3 to obtain intermediate values; whereby the grades 0.7, 4.3, 4.7 and 5.3 are excluded. An individual examined assessment is solely assessed as "passed" or "failed" (ungraded examined assessment) if the relevant module description provides an exception for this. Ungraded examined assessments that are assessed as "passed" do not enter into further grade calculations; ungraded examined assessments assessed as "failed" receive the "fail" (5.0). They are then included in further grade calculations. In part 2: "Subject-specific regulations", it may be stipulated that and how bonus achievements are to be taken into account in the assessment of examined assessments.

(2) Written examinations that students are required to pass in order to continue their studies shall be marked by two examiners as a general rule, however, in the case of repeat examinations, two examiners are compulsory; in the case of oral examinations, oral or other individual assessments not involving any "physical result", or scientific-practical assessments, § 8 para. 5 shall apply accordingly.

(3) The grade of an examined assessment corresponds to the assessment of the examiner or, in the case of para. 1 sentence 2, the joint assessment of the examiners. In all other cases, the grade of an examined assessment corresponds to the average of the individual evaluations in the case of an evaluation by several examiners or, in the case of an evaluation according to para. 1 sentence 5, to the matching individual evaluations; if the individual evaluations do not match, § 26 para. 9 sentences 1 and 2 shall apply accordingly. If a grade or a module grade, overall grade, final grade or, if applicable, combined area grade or study stage grade is calculated as the average of several individual evaluations according to para. 1 or of grades, module grades or the final grade, only the first decimal point is taken into account; all other decimals are omitted without rounding.

(4) The module grade is calculated as the average of the individual examination grades which may be weighted as specified in the module descriptions. On the basis of the averages, the module grades are:

- 1.5 and better = very good
- 1.6 to 2.5 = good
- 2.6 to 3.5 = satisfactory
- 3.6 to 4.0 = pass
- 4.1 and worse = fail.

If a module examination is not passed due to an examined assessment relevant to passing the examination pursuant to § 19 para. 1 sentence 2, the module grade shall be "fail" (5.0).

(5) Module examinations that solely consist of an ungraded examined assessment are assessed as "passed" or "failed" in accordance with the grading of the examined assessment (ungraded module examinations). Ungraded module examinations do not enter into further grade calculations.

(6) For the final examination, an overall grade is calculated. The overall grade comprises the final grade of the final thesis and the module grades of the module examinations included in the final examination, weighted according to the credit points, insofar as part 2: "Subject-specific regulations" does not exempt specific module grades from the overall grade. The final grade of the final theses is composed of the grade of the final thesis and the grade of the colloquium. If the final examination pursuant to § 2 para. 2 sentence 1 does not include a colloquium, the final grade of the final thesis shall be the same as the grade of the final thesis. In part 2: "Subject-specific regulations", provision can be made for combined area grades (*Bereichsnote*) or study stage grades (*Abchnittsnote*) to be formed. The formation of the final grade and, if applicable, combined area grades or study stage grades will be weighted according to the regulations in part 2: "Subject-specific regulations". For the overall grade, final grade and, if applicable, combined area grades or study stage grades, para. 4 sentence 2 applies accordingly, if the average is 1.2 or better, the overall grade is "passed with distinction".

(7) The result of an oral examination will be announced to the student directly after the oral examination. The time for assessing all other examined assessments shall not exceed four weeks; in the case of written examinations with more than 300 participants, the time for assessing shall not exceed eight weeks. Information on the results of these examinations shall be provided in the usual manner.

(8) In order for the examiner to review the assessment of an examination that has not yet become final, a reconsideration of the assessment decision (remonstration) can be requested. For this purpose, the student must submit a request to the examiner and make specific assessment objections. Taking into account the assessment objections raised, the examiner is obliged to review their assessment of the examination and change it if necessary. A downgrading of the examination result is excluded on principle. The student will be informed in writing or electronically about the outcome of the reconsideration process. This does not affect the right to appeal against the examination decision for the module examination in question. The reconsideration process shall be documented in the examination file. The reconsideration process can also take place for the first time during the formal appeal procedure or a subsequent legal action against the examination decision of the corresponding module examination. In this case, in deviation from sentence 2, 1<sup>st</sup> half-sentence, it is initiated ex officio by the chairperson of the Examination Committee.

## § 16

### **Withdrawal, extension of allotted times**

(1) If the student is unable to attend an examination date that is binding for them or is unable to meet a deadline for the submission of an examined assessment that is binding for them, they may withdraw from the examined assessment for valid reasons or apply for an extension of the deadline for the submission (allotted time) of (individual) non-attendance learning assignments pursuant to § 9 para. 3 sentence 2 and § 10 para. 3 sentence 2. A valid reason can be the illness of a child, including children-in-law, adopted children and foster children, as well as the children, adopted children or foster children of the spouse or life partner. The student must declare the withdrawal immediately in writing to the responsible Examination Office, and apply for the extension of the allotted time in due time. The reasons given must be substantiated without delay. In case of illness, the student must provide a doctor's note and, in cases of doubt, a note from a public health officer (*Amtsarzt*).

(2) Acceptance of the withdrawal and extension of the allotted time is subject to the decision of the Examination Committee. If the denial is made after the binding deadline, the examined assessment is deemed to have been assessed as "fail" (5.0) or "failed" if the off-site assessment was not handed in on time. Otherwise, the off-site assessment will be assessed according to § 15 para. 1. If the allotted time is extended, the student must be informed of the new submission date for the examined assessment. If a student does not take an examination that is binding for them and has not withdrawn from the examination, the examined assessment is assessed as "fail" (5.0) or "failed". The same shall apply when an examined assessment is not completed within the specified period of time.

(3) Para. 1 and 2 shall apply accordingly to preliminary academic work, the final thesis, and the colloquium, if required.

## § 17

### **Cheating, violation of rules and regulations**

(1) If a student attempts to manipulate the result of the examined assessment by cheating, e.g. by bringing or using illicit aids, the examination concerned is deemed to be assessed as "fail" (5.0) upon detection by the Examination Committee. Ungraded examinations shall be assessed as "failed" accordingly. A student who is disrupting the normal proceedings of an examination may be excluded from continuing the examination by the respective examiner or proctor; in this case, the examination is given the grade "fail" (5.0) or assessed as "failed". In serious cases, the Examination Committee may exclude the student from taking any further examinations.

(2) If, during an examination, a student has cheated and this is only detected after the publication of the result, the Examination Committee may change the result of the examination to the grade "fail" (5.0) or assess it as "failed" and subsequently change the module grade according to § 15 para. 4. If the requirements for taking a module examination have not been met and the student was not at fault, this irregularity is rectified by passing the module examination. If the student intentionally and unduly obtained admission to an examination, the Examination Committee may assess the module examination as "fail" (5.0) or "failed". In serious cases, the Examination Committee may exclude the student from taking further examinations.

(3) An automated plagiarism check of the result of an examination is only permissible if the Examination Committee has determined that there are actual and documented indications that the result or parts thereof show characteristics of plagiarism. An automated plagiarism check is only permitted in anonymized form. Prior to the automated plagiarism check, especially all features that allow conclusions to be drawn about the individual student and the examiners must be

removed. The assessment of the examined assessment must not be based exclusively on the results of an automated plagiarism check.

(4) Para. 1 and 2 shall apply accordingly to preliminary academic work, the final thesis, and the colloquium, if required. Para. 3 shall apply accordingly to preliminary academic work and the final thesis.

## **§ 18 Waiving**

If the student declares in writing to the relevant Examination Office that they wish to waive the completion of an examination, this examination will be considered "fail" (5.0) or "failed" in the respective examination attempt. The waiver is irrevocable and presupposes admission pursuant to § 4.

## **§ 19 Passing and failing examined assessments**

(1) In order to pass a module examination, the module grade needs to be at least "pass" (4.0) or the ungraded module examination needs to be assessed as "passed". In the cases specified by the module descriptions, the passing of the module examination is also dependent on the assessment of individual examined assessments as at least "pass" (4.0). If the module examination is passed, the credit points specified for the module in the module descriptions are awarded.

(2) The final examination is passed if the module examinations and the final thesis as well as the colloquium, if required, have been passed. The final thesis and the colloquium, if required, are passed, if they have been assessed as at least "pass" (4.0).

(3) A module examination is deemed failed if the module grade is not at least "pass" (4.0) or if the ungraded module examination is assessed as "failed". The final thesis and the colloquium, if required, are failed, if they have not been assessed as at least "pass" (4.0).

(4) A module examination is irrevocably failed if it has not been assessed as at least "pass" (4.0) or if the ungraded module examination is assessed as "failed" and cannot be re-taken. The final thesis and the colloquium, if required, are irrevocably failed if they have not been assessed as at least "pass" (4.0) and if they cannot be re-submitted/re-taken.

(5) The final examination is failed or irrevocably failed if either one of the module examinations or the final thesis or the colloquium, if required, have been failed or irrevocably failed. § 3 para. 1 remains unaffected. If a module examination is irrevocably failed in the elective compulsory field, the irrevocable failure of the final examination is only declared according to § 23 para. 4 if, within one month after the publication of the module examination results, the student does not change their module or if a change of the module is no longer possible due to the provisions of the Study Regulations. If a student has irrevocably failed the final examination, the student loses the right to take examinations for all other parts of the final examination according to § 2 para 2 sentence 1.

(6) The student will receive an attestation of grades upon request. If a student irrevocably failed the final examination, the attestation must list the completed parts of examined assessments including the results, as well as those that have not been completed (if any), and show that the final examination has been failed.

**§ 20**  
**Free attempt**

(1) Module examinations may also be taken prior to the semesters specified in the study schedule if the admission requirements are met. In this case, taking the module examination for the first time is considered a free attempt, if and to the extent that part 2: "Subject-specific regulations" allows for that.

(2) Upon application by the student, module examinations or examined assessment graded at least "pass" (4.0) may be repeated once the next time the examination is regularly held in order to improve the grade. In this case, the better assessment counts. The Examination Committee specifies the procedure and the deadline for the application and publishes them in the usual manner. Once the next regular examination date or the application deadline has passed, the student can no longer improve their grade. When a module examination is repeated in order to improve the grade, examination results that were graded at least "pass" (4.0) in the free attempt will be credited upon the student's request. Examined assessments that were assessed as "passed" in the free attempt will be credited ex officio.

(3) A module examination that has not been passed in the free attempt shall be deemed not to have been taken. Examined assessments that have been assessed with at least "pass" (4.0) or with "passed" will be credited in the following examination procedure. If the option to improve grades pursuant to para. 2 is used for examined assessments, the better grade will be credited.

(4) In addition to § 14 para. 2, periods of interruption of studies due to a prolonged illness of the student or a child to be cared for predominantly by the student, including children-in-law, adopted and foster children, as well as children, adopted or foster children of the spouse or partner, and periods of study abroad shall not be counted when applying the free attempt rule.

**§ 21**  
**Repeating module examinations**

(1) Failed module examinations can be repeated in a second examination attempt once within one year following the first examination attempt. This period of time begins with the announcement of the first failed attempt of the module examination. Following the expiration of this deadline, the examination is deemed to be failed again.

(2) A module examination can only be repeated a second time in a third examination attempt the next time it is held. After that, the module examination is deemed to have been irrevocably failed. Another repeat examination is not permissible.

(3) Repeating a failed module examination that consists of several parts entails only those examined assessments that were not assessed as at least "pass" (4.0) or "passed". When repeating a failed module examination that includes one or more elective examined assessments, students are not bound to the previous selection of an examined assessment not graded with at least "pass" (4.0) or with "passed".

(4) Repeating a module examination that has been passed is only permitted in the case regulated in § 20 para. 2 and includes all examined assessments.

(5) Failed attempts at the module examination in the same or in other degree programs are taken into account.

## **§ 22**

### **Recognition of study achievements and examined assessments, periods of study, and qualifications obtained outside a university**

(1) Study achievements and examined assessments accomplished at a different university are recognized upon request of the student if there are no substantial differences in the acquired skills. Further agreements between TU Dresden, the German Rectors' Conference, the Standing Conference of the Ministers of Education and Cultural Affairs, as well as agreements ratified by the Federal Republic of Germany shall be observed, if applicable.

(2) Qualifications obtained outside a university are recognized upon request of the student if they are deemed to be at least equivalent. Qualifications are equivalent if their contents, scope and requirements are fundamentally similar to parts of the degree program. The qualification comparison shall not be schematic, instead it should be considered and assessed in its entirety. Qualifications acquired outside of a university can substitute for a maximum of 50% of the degree program.

(3) Study achievements and examined assessments accomplished at a different university can be recognized despite substantial differences if, when assessed as a whole, their contents and qualification objectives are equivalent to the intent and purpose of the modules included in the degree program, and they are thus structurally equivalent (structural recognition). The degree certificate shows the assessments that were actually accomplished.

(4) If study achievements and examined assessments are recognized or if qualifications obtained outside a university are recognized, the respective study periods are ex officio recognized as well. If the grading systems are comparable, grades are transferred and enter into further grading calculations. If the grading systems cannot be compared, a note "passed" is added and the grades do not enter into further grading calculations. Recognition is marked as such in the degree certificate.

(5) For recognition and crediting, students must submit the required documents. Once all documents have been submitted completely, the recognition procedure must not exceed two months. If recognition is denied, § 23 para. 4 sentence 1 shall apply. If the student takes the corresponding examined assessment during an ongoing recognition procedure, the assessment of the recognized examination shall apply instead of the assessment of the examination taken, if the request for recognition is granted.

(6) The Examination Committee is responsible for the recognition. It may appoint a dedicated officer for recognition. They carry out the recognition procedure independently. § 23 para. 4 sentence 1 shall apply accordingly to the recognition officer.

## **§ 23**

### **Examination Committee**

(1) An Examination Committee for the degree program is established that will conduct and organize examinations and take on the tasks assigned in the Examination Regulations. The Examination Committee consists of four lecturers, one research associate, and two students. With the exception of the students, the term of office shall be three years. The term of office of the student members shall be one year.

(2) The members and their deputies are appointed by the Faculty Board, Scientific Council, or School Committee of the body managing the degree program, or the Faculty Boards, Scientific Councils or School Committees of the bodies managing the degree program; the student members and their deputies are appointed upon proposal of the Faculty Student Council. The chairperson

and the deputy chairperson are elected by the Examination Committee from among its members and must each be a university lecturer.

(3) The Examination Committee ensures that the stipulations of the Examination Regulations are adhered to. The Committee reports on a regular basis to the body or bodies managing the degree program as well as to the faculties, centers or Schools that are involved in the teaching for the degree program on the development of examination and study periods including the actual time spent on the final thesis, as well as about the distribution of the module and overall grades. The Examination Committee makes suggestions to reform the Examination Regulations and the Study Regulations.

(4) Decisions that adversely affect students must be announced to them in writing or electronically, including a justification and information about legal appeal options. As the appeal authority, the Examination Committee decides on appeals within a reasonable period of time, and communicates its decisions concerning the appeal.

(5) The chairperson normally manages the Examination Committee. The Examination Committee may also delegate individual tasks to the chairperson for independent processing and decision-making if the student members all agree; a resolution must be passed to this effect that also includes the way in which the members are to be informed about the decisions made by the chairperson. This does not apply to decisions pursuant to para. 4 sentence 2. If any or all of the members of the Examination Committee are reappointed, any previous delegation shall expire.

(6) The Examination Committee can allow guests without voting rights to attend its meetings. The members of the Examination Committee are entitled to attend any examination and the colloquium, if any.

(7) The members of the Examination Committee and their deputies must abide by the duty of official confidentiality. The chairperson shall oblige any members who are not public service staff to maintain official confidentiality. The same applies to guests.

(8) The Examination Office assigned as responsible organizes the examinations and manages the examination files.

## **§ 24**

### **Examiners and assessors**

(1) The Examination Committee appoints the examiners from individuals who are authorized to be examiners under Saxon State Law. The respective examiner appoints the assessors, who must be experts in the field; they should have at least the degree that is sought by the examination.

(2) The student may nominate the examiners for their final thesis, the oral examination and the colloquium, if any. This suggestion does not bear any entitlement.

(3) For examiners and assessors, § 23 para. 7 shall apply accordingly.

(4) The names of the examiners should be made known to the student in good time.

## § 25

### Purpose of the final examination

(1) Passing the final examination concludes the degree program and qualifies the student for professional work.

(2) Passing the Bachelor's examination proves that the student has an overview of the subject-specific contexts, has a critical understanding of the most important theories, principles and methods of the field of study, is able to deepen knowledge beyond the discipline, and has acquired the in-depth specialized knowledge required for entering professional life. Moreover, passing the Bachelor's examination proves that the student is qualified to pursue a Master's program.

(3) Passing the *Diplom* or Master's examination proves that the student has an overview of the subject-specific contexts, can apply their knowledge and understanding as well as problem-solving skills also in new and unfamiliar situations that have a broader or multidisciplinary connection with the field of study, and has acquired the in-depth specialized knowledge required for entering professional life. Moreover, passing the *Diplom* or Master's examination proves that the student is qualified to take up doctoral studies.

## § 26

### Final thesis and colloquium

(1) The purpose of the final thesis is to prove that the student is able to analyze issues of the degree program through independent work and within a given period of time, using academic methods.

(2) The final thesis must be supervised by one of the examiners according to para. 7. This examiner determines the topic of the final thesis and supervises and supports the student in the preparation of the final thesis. The examiner may delegate the supervision of the final thesis to a qualified person.

(3) The Examination Committee issues the topic of the final thesis. The topic, date of issue, and scheduled date of submission must be documented. Students are allowed to suggest a topic. Upon the request of the student, the Examination Committee issues the topic of the final thesis in a timely manner. The Examination Committee issues the topic *ex officio* at the latest at the beginning of the semester that follows the completion of the last module examination.

(4) The topic can be changed only once and only within the first half of the time allocated for submission. In case of re-submission of the final thesis, changing the topic is only permitted if the student did not use this option previously in this degree program. If a student has changed their topic, they are immediately issued a new topic in accordance with para. 3 sentences 1 to 3.

(5) The final thesis must be submitted in German or, depending on the topic, in another language. Upon a student's request, it may be submitted in another language if the Examination Committee agrees to this in consultation with the examiner pursuant to para. 2 sentence 1. It may also be produced as a group thesis if the individual contribution to be assessed as the student's final thesis is clearly distinguishable and assessable due to the indication of sections, page numbers or other objective criteria that allow a clear delimitation, and if this contribution fulfills the requirements pursuant to para. 1.

(6) The final thesis must be submitted to the relevant Examination Office in the form and with the number of copies specified in part 2: Subject-specific regulations in due time; the date of submission must be documented. The student must declare in writing that they have written the thesis



or, in the case of a group thesis, the appropriately marked part of the paper - independently and has not used any sources or aids other than those indicated.

(7) The final thesis must be marked by two examiners separately according to § 15 para. 1 sentences 3 and 4. The time for marking the thesis shall not exceed six weeks. In part 2: "Subject-specific regulations", it may be provided that an examiner is or may be replaced by a board of examiners. The members of the board of examiners will jointly determine the individual grade of the final thesis in accordance with § 15, para. 1, sentences 3 and 4.

(8) The grade for the final thesis is calculated as the average of the individual grades given by the two examiners. If the two individual grades given by the examiners differ by more than two grades, the Examination Committee shall obtain an assessment from a further examiner. In this case, the grade of the final thesis is calculated as the average of the three individual grades. § 15 para. 3 sentence 3 shall apply accordingly.

(9) If one of the examiners has assessed the final thesis as at least "pass" (4.0) and the other examiner as "fail" (5.0), the Examination Committee arranges for the thesis to be marked by an additional examiner. The additional examiner then decides whether the final thesis is passed or failed. If the thesis is then deemed to be passed, the grade of the final thesis is calculated as the average of the individual grades given in favor of pass; if it is deemed to be failed, it is calculated as the average of the individual grades given in favor of fail. § 15 para. 3 sentence 3 shall apply accordingly.

(10) A failed final thesis can be re-submitted once within a one-year period. Following the expiration of this deadline, it is deemed as failed again. A second re-submission is only possible at the next available examination date, following that date it is deemed to be irrevocably failed. Any further re-submission or a re-submission after already having passed the final thesis is not permitted.

(11) If the final examination pursuant to § 2 para. 2 sentence 1 includes a colloquium, the student must present their final thesis in a public colloquium in front of at least one of the examiners and one assessor. As a subject-specific admission requirement, the final thesis must have been assessed with a grade of at least "pass" (4.0) prior to the colloquium. The colloquium is intended to demonstrate that the student is able to coherently present the results of the final thesis and to discuss them with expert knowledge. Additional examiners may be called in (colleague examination). Para. 10 as well as § 8 para. 5 sentence 2, § 15 para. 1 sentences 1 to 4 and § 15 para. 7 sentence 1 shall apply accordingly.

(12) If, for reasons for which the student is not responsible, the time already taken to complete the final thesis reaches twice the allotted time, the Examination Committee may decide ex officio to discontinue the thesis with no result. Prior to a decision, both the examiner pursuant to para. 2 sentence 1 and the student must be heard. An inconclusive termination may occur if the examination purpose of the final thesis can no longer be achieved in relation to the time already spent to complete the thesis. When taking the decision, the reasons for the time spent, the consequences of the termination for the student and the options for continuing the examination procedure in a reasonable way must be taken into account and weighed up against each other. If the Examination Committee discontinues the thesis with no result, the examination attempt is retained; ongoing examination deadlines will be extended. The Examination Committee will also determine how the examination process is to be continued. The student will receive a notification that is open to appeal.

## § 27

### Examination certificate and degree certificate

(1) The student shall receive an examination certificate and a supplement to the certificate without delay, if possible within four weeks, confirming that they have passed the final examination. Part 2: "Subject-specific regulations" may stipulate that the student be issued an additional supplement to the certificate. If part 2: "Subject-specific regulations" provides for a division into study periods, the student shall receive an interim certificate on the first study period without delay, if possible within four weeks after passing the last module examination included in this study period.

(2) The examination certificate shall include the module results of the module examinations included in the final examination and, where applicable, an indication of the recognized achievements and results, the topic of the final thesis, its final grade pursuant to § 15 para. 6 sentences 3 and 4, the examiners of the final thesis, the overall grade pursuant to § 15 para. 6 sentence 2 as well as the credit points. The grades and, where applicable, an indication of the recognized achievements and results of the individual examined assessments, the final thesis and the colloquium, if any, are indicated on the supplement to the certificate. The interim certificate shall contain the module assessments of the module examinations covered by this study period as well as the corresponding credit points and, if applicable, an indication of the recognized achievements and results.

(3) The examination certificate and the interim certificate are issued with the date of completion of the last part of the examination pursuant to § 19 para. 2 or § 19 para. 1 sentence 1. They are signed by the chairperson of the Examination Committee and bear the seal of TU Dresden that is used by the managing body of the degree program or by one of these bodies. The supplements to the certificate are signed by the chairperson of the Examination Committee and bear the date of the certificate.

(4) Concurrent with receiving the examination certificate, the student receives the degree certificate with the date identical to that of the examination certificate. This document certifies the award of the university degree. In Bachelor's degree programs, the Bachelor's degree is awarded, in Master's degree programs the Master's degree is awarded, and in *Diplom* degree programs the *Diplom* degree is awarded pursuant to the regulations in part 2: "Subject-specific regulations". The degree certificate is signed by the chairperson of the Examination Committee and bears the handwritten or electronic signature of the Rector, alongside the seal of TU Dresden. Additionally, students are provided with an English translation of both the degree certificate and the examination certificate. If part 2: "Subject-specific regulations" provides for a cooperation with joint awarding of the university degree, the degree certificate is issued jointly by TU Dresden and the cooperation partners.

(5) TU Dresden issues a Diploma Supplement (DS) in accordance with the Diploma Supplement model of the European Commission, Council of Europe and UNESCO are/CEPES. For information on the German higher education system (DS para. 8), the text agreed upon by the Conference of the Ministers of Education and Cultural Affairs and the German Rector's Conference shall be used as amended.

(6) Part 2: "Subject-specific regulations" may specify which additional information is to be shown on the examination certificate, the supplements to the certificate, the interim certificate, if any, and the degree certificate.

## **§ 28**

### **Voiding an examination**

(1) If a student has cheated in an examined assessment and if this cheating is only discovered after the interim certificate or examination certificate has been issued, the result of the examined assessment can be amended according to § 17 para. 2 sentence 1. If applicable, the Examination Committee may declare the grade of the module examination as “fail” (5.0) and the final examination as “failed”. The same applies to ungraded module examinations, the final thesis, and the colloquium.

(2) If the requirements for taking a module examination had not been met and this had not been discovered prior to the issuance of the interim certificate or the examination certificate and the student was not at fault, this irregularity is rectified by passing the module examination. If the student intentionally and unduly obtained admission to a module examination, the Examination Committee may assess the module examination as “fail” (5.0) and the final examination as “failed”. The same applies to ungraded module examinations, the final thesis, and the colloquium.

(3) An incorrect interim certificate or an incorrect examination certificate and its translation as well as all other documents issued upon graduation shall be withdrawn by the chairperson of the Examination Committee and, if necessary, reissued. If the final examination has been declared “failed” due to cheating, the degree certificate, any translations, and the Diploma Supplement shall be retracted together with the now invalid examination certificate. Following a period of 5 years since the date of the examination certificate, a decision according to para. 1 and para. 2 sentences 2 or 3 is no longer permissible.

## **§ 29**

### **Access to examination documents and examination files**

(1) Once the result of the examination has been announced, the student will be granted access to their written examinations, to reviewers’ reports, and to examination protocols. For this purpose, there are usually central dates for accessing the results within a reasonable period of time, but no later than eight weeks after the examination result has been announced. If, due to the type of examination or for organizational reasons, no central date is possible or scheduled, the student will be granted an individual date upon request. In this case, the application must also be submitted to the relevant Examination Office no later than eight weeks after the announcement of the examination result. It must be ensured in any case that the student only has access to the documents concerning themselves.

(2) Irrespective of the possibility to access the examination documents according to para. 1, the student has the right to access their examination file kept by the relevant Examination Office. The statutory provisions shall apply.

## **Part 2: Subject-specific regulations**

## **§ 30**

### **Duration and scope of the degree program**

(1) The standard period of study according to § 1 is four semesters.

(2) The final examination pursuant to § 2 para. 2 sentence 1 does not include a colloquium. By passing the final examination, a total of 120 credit points are awarded for modules and the final examination.

### **§ 31**

#### **Bonus achievements**

Students may voluntarily earn bonus credits for specific examined assessments by completing certain study achievements (bonus achievements). Bonus credits may substitute a maximum of 10% of the total credit of the examined assessment they are assigned to while supplementing the assessment credits earned by the student, if the examined assessment has been assessed with at least "pass" (4.0). The type and form of the bonus achievements as well as their assignment to an examined assessment must be regulated in the module descriptions. The number of bonus credits that can be earned through bonus achievements, as well as the total number of credits that can be earned in the associated examined assessment, will be announced in the usual manner at the beginning of each semester. Earned bonus credits will only be counted towards the next examination date that follows the bonus achievement and that is binding for the student. § 4 para. 2, § 14 paras. 1 to 3, § 16 para. 1 and 2 and § 17 para. 1 to 3 shall apply accordingly to bonus achievements.

### **§ 32**

#### **Subject, nature and scope of the final examination**

(1) The final examination pursuant to § 2 para. 2 sentence 1 comprises all module examinations of the modules of the compulsory field and the module examinations of the selected modules of the elective compulsory field.

(2) Modules of the compulsory field are

1. Numerical methods for partial differential equations – Basic concepts
2. Finite element methods – Theory, implementation and applications
3. Modelling seminar
4. Research project
5. Scientific literature – Research topics.

(3) Modules of the elective compulsory field are the modules indicated in the annex. From the elective compulsory field, modules amounting to a least 66 credit points must be selected.

1. From the elective compulsory field M, seven modules amounting to a least 42 credit points must be selected.
2. Elective compulsory modules of the elective compulsory field N are each assigned to a specialization. The specializations of the degree program include: Electrical Engineering – Basic, Electrical Engineering – Advanced, Computer Science – Basic, Computer Science – Advanced, Mechanical Engineering – Basic, Mechanical Engineering – Advanced, Physics – Basic and Physics – Advanced. From a specialization, three to four modules amounting to a least 24 credit points must be selected.

### **§ 33**

#### **Free attempt**

A free attempt according to § 20 is not possible.

### **§ 34**

#### **Allotted time, form and copies of the final thesis**

(1) Students have 20 weeks to complete their final thesis, and 27 credit points are awarded for it. In specific cases and upon justified request by the student, the Examination Committee may extend the period by up to a maximum of half of the allotted time, the number of credit points awarded remains unaffected.

(2) The final thesis must be submitted to the relevant Examination Office in electronic form. In consultation with the examiners, the final thesis must also be submitted in up to three typed and bound copies.

### **§ 35**

#### **Weighting to determine the overall grade**

When calculating the overall grade pursuant to § 15 para. 6, the final grade of the final thesis will be weighted 27 times.

### **§ 36**

#### **Additional information in graduation documents**

Upon request of the student, the examination certificate can also show the results of additional modules including the corresponding credit points as well as the results of examined assessments in additional modules.

### **§ 37**

#### **University degree**

If the Master's examination is passed, the "Master of Science" degree (abbr. M.Sc.) is awarded.

## **Part 3: Final regulations**

### **§ 38**

#### **Entry into force, publication and interim arrangements**

(1) These Examination Regulations enter into force on April 1, 2023 and are published in the official announcements of TU Dresden.

(2) They apply to all newly enrolled students in the Master's program in Technomathematics in the 2023/2024 winter semester or later.

(3) For students who enrolled prior to the 2023/2024 winter semester, the version of the Examination Regulations for the consecutive Master's degree program in Technomathematics that has been valid for them up until the amendment continues to apply unless they declare their acceptance of the amendment in writing. The form and deadline of this declaration are specified by the Examination Committee and are announced in the usual manner. Switching to the new regulations is possible at the earliest on October 1, 2023.

Issued based on the resolution of the Faculty Board of the Faculty of Mathematics as of January 25, 2023, and the approval of the University Executive Board as of March 14, 2023.

Dresden, March 30, 2023

The Rector  
of Technische Universität Dresden

Prof. Ursula M. Staudinger

## **Annex: Modules of the elective compulsory area**

### **I. Elective compulsory field M**

The modules of the elective compulsory field M include:

1. Algebraic structures
  2. Model theory
  3. Discrete structures
  4. Algebra and number theory
  5. Group theory
  6. Commutative algebra
  7. Noncommutative geometry
  8. Algebraic topology
  9. Groups and geometry
  10. Algebraic methods in geometry
  11. Real algebra
  12. Functional analysis
  13. Methods of functional analysis
  14. Nonlinear analysis
  15. Methods of analysis
  16. Partial differential equations
  17. Methods for partial differential equations
  18. Dynamical systems – Basic concepts
  19. Dynamical systems – Modern concepts and applications
  20. Probability with martingales
  21. Methods of financial and actuarial mathematics
  22. Stochastic calculus
  23. Stochastic processes
  24. Mathematical statistics
  25. Statistical methods
  26. Continuous optimization
  27. Discrete optimization
  28. Numerical methods for partial differential equations – Advanced concepts
  29. Mathematical methods in continuum mechanics
  30. Scientific computing – Advanced concepts
  31. Scientific programming – Advanced concepts
  32. Models and methods of applied mathematics
  33. Models and methods of pure mathematics
  34. Mathematical Internship,
- of which seven modules amounting to at least 42 credit points must be selected.

## II. Elective compulsory field N

The modules of the specialization in the elective compulsory field N include:

1. In the specialization Electrical Engineering – Basic:
  - a) Basics of Electrical Engineering
  - b) Electric and Magnetic Fields
  - c) Dynamic Networks
  - d) Communications Engineering
  - e) Systems Theory
  - f) Electronic Systems Design
  - g) Circuit Design
  - h) Research and Business Internship.
2. In the specialization Electrical Engineering – Advanced:
  - a) Circuit Design
  - b) Signal Theory
  - c) Information Theory
  - d) Automation and Measurement Technology
  - e) Basics Electromagnetic Theory
  - f) Advanced Electromagnetic Theory
  - g) Technologies and Components of Microelectronics
  - h) Research and Business Internship.
3. In the specialization Computer Science – Basic:
  - a) Programming and Robo-Lab
  - b) Algorithms and Data Structures
  - c) Software Technology
  - d) Computer Architecture
  - e) Computer Architecture and Hardware Laboratory
  - f) Operating Systems
  - g) Security
  - h) Formal Systems
  - i) Research and Business Internship.
4. In the specialization Computer Science – Advanced:
  - a) Formal Systems
  - b) Artificial Intelligence
  - c) Theoretical Computer Science and Logic
  - d) Computer Networks
  - e) Databases and Information Systems
  - f) Software Technology Project
  - g) Machine Learning and Data Mining
  - h) Parallel Programming and High-Performance Computing
  - i) Data Visualization
  - j) Research and Business Internship.
5. In the specialization Mechanical Engineering – Basic:
  - a) Technical Mechanics – Statics
  - b) Technical Mechanics – Theory of Strength of Materials
  - c) Technical Mechanics – Kinematics and Kinetics
  - d) Design Theory
  - e) Fundamentals of Fluid Mechanics
  - f) Research and Business Internship.

6. In the specialization Mechanical Engineering – Advanced:
  - a) Fundamentals of Fluid Mechanics
  - b) Continuum Mechanics and Multifunctional Structures
  - c) Analytical Methods in Solid Mechanics
  - d) Elastic Structures and Technical Fluid Mechanics
  - e) Numerical Methods and Structural Durability
  - f) System Dynamics and Structural Vibrations
  - g) Data Processing and Experimental Model Analysis
  - h) Research and Business Internship.
7. In the specialization Physics – Basic:
  - a) Experimental Physics – Mechanics and Thermodynamics
  - b) Experimental Physics – Electromagnetism and Optics
  - c) Experimental Physics – Waves and Quanta
  - d) Computational Methods in Physics
  - e) Theoretical Mechanics
  - f) Theoretical Electrodynamics
  - g) Introductory Lab Course and Basic Lab Course – Mechanics and Heat
  - h) Research and Business Internship.
8. In the specialization Physics – Advanced:
  - a) Experimental Physics – Waves and Quanta
  - b) Theoretical Electrodynamics
  - c) Basics of Quantum Theory
  - d) Particle and Nuclear Physics
  - e) Solid-State Physics
  - f) Basic Lab Course – Electromagnetism, Optics
  - g) Research and Business Internship.

Students must choose a specialization, in which they must select three to four modules amounting to a least 24 credit points.