

**Examination Regulations
for the Master's Degree Programme in Technomathematics
at the Faculty of
Computer Science, Electrical Engineering and Mathematics
at the University of Paderborn**

Released on: 31 May 2013

Note: The following translation of the German "Prüfungsordnung" (AM.Uni.Pb.Nr. 48/13) for the Master's degree programme in Technomathematics is offered here for the convenience of our international students. Legally valid is the German version only.

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Based on § 2 Section 4 and § 64 Section 1 of the "Gesetz über die Hochschulen des Landes Nordrhein-Westfalen (Hochschulgesetz – HG)" (State of North Rhine-Westphalia Higher Education Act) released on 31 October 2006 (GV.NRW:2006, page 474), last amended by Article 1 of the "Gesetz zur Änderung des Hochschulgesetzes und des Kunsthochschulgesetzes" (Law on the Amendment of the Higher Education Act and the Art Colleges Act) released on 18 December 2012 (GV.NRW.2012, page 672), the University of Paderborn has issued the following examination regulations:

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I General Provisions

§ 1

Reason for the Examinations, Structure and Objective of the Studies

(1) The final examination for the Master's degree offers a second (and postgraduate) degree for studies in Technomathematics that qualifies for the primary labour market. The Master's degree programme in Technomathematics has a duration of 4 semesters. It encompasses

- basic studies for the Master's degree
- specialisation
- the Masters's thesis

(2) The aim of the final examination for the Master's degree is to determine whether the students have broadened the knowledge, required for a professional life and obtained in a preceding Bachelor degree, and have specialised in elected areas, such that they possess the ability to independently apply mathematical methods and scientific findings and to develop these further in their area of specialization.

(3) Apart from the general objectives of a university degree of the HG § 58, the studies equip the students with the ability to independently apply mathematical methods and scientific findings in their work and to develop these further.

§ 2

Degree

For passing the final examination for the Master's degree the Faculty of Computer Science, Electrical Engineering and Mathematics awards the academic degree "Master of Science", abbreviated by "M.Sc.". This is recorded on a certificate.

§ 3

Start of the Studies and Admission Requirements

(1) The studies commence in the winter semester or the summer semester.

(2) Applicants can only be admitted to the Master's degree programme in Technomathematics if they

1. possess the university entrance qualification certificate (general or relevant subject specific university entrance qualification), or a certificate that has been declared to be equivalent via a legislative provision or by the responsible governmental agency, or satisfies the requirements for persons qualified via vocational education.
2. possess a first (and undergraduate) degree from the Bachelor's degree programme in Technomathematics at the University of Paderborn, from an equivalent or comparable degree programme in Mathematics or a relevant degree programme at a university or a university of applied science in the territory covered by the German Constitution, or have obtained an equivalent degree from a foreign university or university of applied science. The degrees from a university or a university of applied science in the territory covered by the German Constitution must have a normal duration of the degree programme of at least 6 semesters and must qualify for the primary labor market. For determining the equivalence of foreign degrees the agreements of equivalence approved by the "Kultusministerkonferenz" (Conference of the Ministers of Education and Cultural Affairs) and the "Hochschulrektorenkonferenz" (Conference of the Vice Chancellors of the Universities and Universities of Applied Science) or corresponding legislative regulations have to be taken into account. Furthermore, if there are any doubts about the equivalence of degrees the "Zentralstelle für ausländisches Bildungswesen" (Central Office for Foreign Education) shall

be consulted. In case a decision on the equivalence of foreign degrees is based on the knowledge, skills and expertise certified by the degree, the degrees have to be declared equivalent, unless there is a significant difference between the knowledge, skills and expertise of the two degrees. The Examination Board decides about the equivalence or comparability of the degree programme and the equivalence of the foreign degree. The Examination Board, in consultation with the candidate, determines for graduates with relevant degrees which additional examinations have to be passed by the candidate as a further prerequisite for admission.

(3) The enrolment has to be declined if

3. the requirements listed in (2) are not satisfied
4. the candidate has irrevocably failed an examination in a Master's degree programme in Technomathematics or in a related or comparable degree programme at a university or a university of applied science in the territory covered by the German Constitution. In related or comparable degree programmes the refusal to enroll a candidate has to be limited to the case that the candidate has irrevocably failed an examination that is a compulsory examination in the Master's degree programme in Technomathematics and that is to be considered as equivalent. With respect to any other reasons for the refusal (to enroll a candidate), the "Einschreibordnung" (Enrolment Regulations) of the University of Paderborn, in their currently valid version, have to be applied.

§ 4

Normal Duration of the Master's Degree Programme and Scope of the Studies

(1) The normal duration of the Master's degree programme, including the final examination for the Master's degree, is four semesters. This is based on the assumption that the total workload for the students is approximately 3,600 hours (corresponding to 120 "Leistungspunkte" (credits) (LP)).

(2) The course of studies covers modules with a total of 120 LP. All modules offered are elective modules.

(3) LP stands for „Leistungspunkte" (credits) corresponding to the number of credit points required by the European Credit Transfer Systems (ECTS). One "Leistungspunkt" (credit) corresponds on average to a workload of 30 hours.

(4) Based on these examination regulations, the Faculty of Computer Science, Electrical Engineering and Mathematics has created an exemplary degree course scheme and module descriptions. In particular, these documents inform about the objectives of the individual modules and of the courses associated with these modules, as well as the required previous knowledge and the course content. The module description explains, in which form and to which extent key skills can be acquired. These cover at least 6 LP and contribute to the assessment. The exemplary degree course scheme and the lists of the modules are appended to these examination regulations as an attachment.

(5) The content of the courses was selected, such that the workload indicated by the "Leistungspunkte" (credits) has been taken into account.

(6) The Master's degree programme stipulates courses from the "Studium Generale" (General Studies) covering 6 to 12 LP. The modules and courses, respectively, from the "Studium Generale" (General Studies) have to be chosen outside Mathematics and outside the specialised subject.

§ 5

Modular System

(1) The Master's degree programme in Technomathematics is offered in modular form. Modules are topically and temporally rounded and self-contained. Modules are endowed with "Leistungspunkte" (credits) and are units of qualification that can be independently assessed. All modules are assessed with a mark. Modules are completed with the passing of a module examination, based on which "Leistungspunkte" (credits) and marks are awarded. A module consists of one or more courses.

(2) The modules in the studies for the Master's degree are electives. All modules chosen by a student that cannot be deselected according to § 9 (5) have to be completed successfully during the course of the studies.

(3) The available electives can be found in the module handbook. Modules can be distinguished by their different code numbers.

§ 6

Examinations and Modalities of Examination

(1) A module is completed with a final module examination and usually through some items of work according to (4). Admissible modes of assessment for the final module examination are a written examinations (§ 7), oral examinations (§ 8) and the other forms of achievement described in (3).

(2) If the final module examination is a written or an oral examination, then at least two different dates for the examination are offered following the course. The first date usually lies in the semester break after the course. The second date is within an appropriate distance to the first date but at the latest 6 months after the first date. The examination at the second date can be offered as a written or an oral examination.

(3) Other admissible forms of achievement are a talk in a seminar or a presentation about a project, respectively. A talk in a seminar or a presentation about a project, respectively, lasts usually 60 to 90 minutes. In addition to the talk or the presentation, respectively, a written report can be requested. By means of the talk in a seminar or a presentation about a project, the students shall demonstrate that they can independently develop and present scientific results. This accomplishment can also be achieved as a group effort, as long as the individual assessment of the individual contributions of each member of the group is possible.

(4) Items of work are evidence of qualified participation or course work that needs to be passed and that is solely required for this specific course. Items of work are usually delivered accompanying the course. Admissible types of items of work are exercises discussed in the tutorial, homework, course attendance certificates, project reports or a portfolio. Starting with the second week of the teaching time, homework is usually handed on a weekly basis during the semester and aims at preparing the students step by step for the subsequent examinations. The homework can be assessed and be used to improve the mark for the module following a previously agreed scheme (bonus system). The final module examination must be passed independently of the bonus system. The bonus system can improve the mark for the module by at most one mark.

(5) The module examination has been passed when all items of work have been delivered and the final module examination has been passed, that is, if the final module examination has been assessed as at least "ausreichend" (sufficient). The mark for the module is determined from the mark for the final module examination and, if applicable, from the bonus system described in (4).

(6) The forms of assessment and the modalities of examination for the final module examination, forms of achievement and the scope of the items of work, as well as the use of a bonus system (including the scheme mentioned in (4)) must be determined by the Examination Board in consultation with the examiner and must be published, at the latest in the first week of teaching. The publication is done via the Campus Management System.

(7) For any courses in the "Studium Generale" (General Studies) and the specialised subject, respectively, in any cases of cheating and breach of regulations and for the examination length the respective regulations of the subject that hosts the course are applied. These examination regulations are applied with respect to registration, deregistration, withdrawal, assessment of the performance in the examination and the awarding of "Leistungspunkte" (credits). If required the awarding of "Leistungspunkte" (credits) has to be determined by the Examination Board for the principal subject.

(8) If a candidate provides convincing evidence in the form of a medical certificate that she or he was unable to take the examination in the intended form as a whole or in parts, due to a long-lasting or permanent physical disability, then the Chair of the Examination Board has to make sure that the candidate is given the opportunity to take an examination in a different form, which is as far as possible equivalent to the originally intended examination.

§ 7 Written Examinations

- (1) In written examinations, the candidate shall prove that she or he can investigate and solve problems from the assessed topic in a given time frame, using only the resources allowed by the examiner and the methods taught.
- (2) Every written examination is assessed by at least one examiner according to § 12 (2). If the written examination is a repeated examination the failing of which will mean that the examination has been irrevocably failed, then it has to be assessed by two examiners, according to § 12 (2).
- (3) The length of a written examination in Technomathematics is usually 120 minutes.
- (4) The students have to be notified of the results of any written examinations via the Campus Management System or via a placard, at the latest 6 weeks after the examination.
- (5) For any written examinations in the specialised subject and the "Studium Generale" (General Studies), the regulations of the relevant subject are applied.

§ 8 Oral Examination

- (1) In oral examinations the candidate shall prove that she or he recognizes the interrelations within the topic of assessment and can classify particular problems within this context. Furthermore, the aim of the oral examination is to determine whether the candidate has a sufficiently broad knowledge of the basic principles.
- (2) Oral examinations are either held by of two examiners (co-operative examination) or by one examiner in the presence of an expert observer (see §12 (2) and §12 (3)) as individual examinations. § 7 (2) applies accordingly. According to § 15 (1), before determining the mark, the examiners confer with each other or the examiner listens to the input of the expert observer, respectively, in the absence of the candidate.
- (3) For each candidate, the length of an oral examination is usually 30 minutes.
- (4) The essential topics and results of the examination are recorded in a protocol. Subsequent to the oral examination, the candidate has to be notified of the result of the examination.
- (5) Students who intend to take the same examination at a later date for the examination are allowed to observe subject to available space, unless the candidate dissents. This permission to observe does not extend to the consultation and the announcement of the result of the examination.
- (6) For any oral examinations in the specialised subject and in the "Studium Generale" (General Studies), the regulations of the relevant subject are applied.

§ 9 Passing of Examinations and Modules, Compensation and Repeated Attempts at Examinations

- (1) A module examination has been passed, when the final examination and every course-specific partial examination has been passed, that is, the given mark is at least "ausreichend" (sufficient) (4,0), and when all items of work have been delivered. A module examination has been irrevocably failed if the final examination or a course-specific partial examination has irrevocably been failed.
- (2) Once an examination has been passed, it cannot be repeated.
- (3) On request of the candidate, a passed examination that has been classified as a supplementary examination, according § 22, can be substituted for another passed examination (compensation) if the supplementary examination can be booked instead of this examination.
- (4) A failed examination can be repeated twice. On request of the candidate, the second repeat attempt of a written examination can be held as an oral examination.

(5) Once an examination (within a module) has been sat, the elective module has been selected. The deselection of any elective modules that have been irrevocably failed is also possible. The deselection has to be applied for in writing with the Examination Office. The number of irrevocably failed elective modules that can be deselected is limited to two. Any modules that have already been passed cannot be deselected.

(6) For any courses from the “Studium Generale“ (General Studies) and the specialised subject, respectively, the regulations for possible repeat examinations and compensation of these examination regulations are applied.

(7) Regarding the possibility to repeat the Master’s thesis refer to § 20.

§ 10 Registration and Deadlines

(1) For every module and every course a separate registration in the Campus Management System is required. A registration is only possible if the prerequisites for admission according to § 16 (1) are satisfied. A registration for the examinations according to § 6 has to take place within the registration periods listed in the Campus Management System.

(2) A deregistration from an examination can take place at the latest one week before the date of the examination by notifying the Examination Office without giving any reasons. For examinations according to § 6 (3), the date of the talk in the seminar or the date of the project presentation, respectively, is considered as the date of the examination.

§ 11 Examination Board

(1) The Faculty Council (“Fakultätsrat”) of the Faculty of Computer Science, Electrical Engineering and Mathematics forms an Examination Board (“Prüfungsausschluss”) for the Bachelor’s and Master’s degree programme in Technomathematics in order to:

- organise the examinations and supervise the procedure of said examinations,
- ensure compliance with the examination regulations and to make sure that any rules of procedure for holding examinations are obeyed,
- decide about any objections against decisions made during examinations,
- write a yearly report for Faculty Council that documents the development of the examinations and the duration of the degree programme,
- attend to any further tasks of the Examination Board that are explicitly assigned to the Examination Board in these examination regulations.

Furthermore, the Examination Board makes suggestions for reforming the examination regulations and the study regulations and discloses the distribution of the marks. The Examination Board can delegate the handling of matters that have no fundamental impact to the Chair; this does not apply to any decisions on objections and to reporting to the Faculty Council. The Chair reports to the Examination Board about any decisions that she or he has taken on her or his own.

(2) The Examination Board consists of the Chair, the Deputy Chair and five more members. Based on the nomination by the respective group, the Chair, the Deputy Chair and two further members from the group of university professors including any full-time academic employees with a habilitation, one member from the group of academic employees and two members from the group of students are elected by the representatives of their respective group in the Faculty Council. The tenure of office of the members the group of university lecturers including any full-time academic employees with a habilitation is three years, the tenure of office of the academic employees is three years, and the tenure of office of the students is one year. Re-election is permissible.

(3) The Examinations Board is a civil service (“Behörde”) in the sense of the “Verwaltungsverfahrensgesetz” (Administrative Proceedings Act) and the “Verwaltungsverfahrensgesetz” (Administrative Procedure Act).

(4) The Examination Board has a quorum, if, in addition to the Chair or Deputy Chair and two more university professors, at least one further member entitled to vote is present. The Examination Board makes decisions by a simple majority. If there is a tie, the vote of the Chair decides. The student members of the Examination Board have only an advisory vote in any educational-scientific decisions; this applies in particular to any assessment, recognition or crediting of course work or examination results, to the determination of assessment tasks and to authorizing examinations and appointing observers.

(5) The Chair convenes the Examination Board. A meeting of the Examination Board has to be convened when at least three members request this.

(6) The Examination Board meets in camera. The members of the Examination Board, their deputies, the examiners and the observers shall maintain confidentiality. If they are not employed in civil service, they have to be placed under an obligation of discretion by the Chair of the Examination Board.

(7) The members of the Examination Board are entitled to be present during examinations.

§ 12

Examiners and Observers

(1) The Examination Board appoints the examiners and the observers. It can delegate appointing the examiners and the observers to its Chair.

(2) Examiners in Mathematics are university professors as well as academic employees with a habilitation and persons experienced in vocational practice and training, where this is required and appropriate for the objective of the examination. Persons, holding a doctorate who, independently and by the decision of the Faculty Council, teach the module for which the examination is scheduled can also be appointed as examiners. The achievement in an examination may only be assessed by persons who have at least the qualification assessed by this examination or an equivalent qualification.

(3) Only persons who have passed the examination for the “Diplom” degree or the Master’s degree in a degree programme in Mathematics at a university or university of applied sciences in the territory of the “Hochschulrahmengesetz” (Framework Law on Universities and Universities of Applied Sciences) or who have passed a comparable examination can be appointed as observers.

(4) The examiners in the specialised subject and in the “Studium Generale” (General Studies) are the examiners in the respective subjects.

(5) The examiners are independent in their role as examiners.

(6) The candidate can suggest examiners for the thesis and – if more than one examiner is available – for the oral examinations. The suggestions of the candidate should be incorporated if possible. However, this does not constitute a claim.

(7) The Chair of the Examination Board makes sure that the candidate is notified of the names of the examiners in due time, usually four weeks but at least two weeks before the date of the examination. The notification via a placard is sufficient.

§ 13

Crediting of Study Periods, Course Work and Examination Results and Placement into a Higher Semester

(1) Study periods, course work and examination results in identical degree programmes at other universities and universities of applied sciences in the territory of the German Constitution are credited ex officio without any enquiry for equivalence.

(2) Study periods, course work and examination results in other degree programmes or at other universities and universities of applied sciences as well as at state or state-recognized universities of cooperative education in the territory of the German Constitution have to be credited if they are equivalent. Upon request, this does also apply to study periods, as well as course work and examination results, at universities or universities of applied sciences outside the territory of the German Constitution. Study periods, course work and examination results have to be considered

equivalent in the sense of clause 1 and 2 if there is not a significant difference with respect to the knowledge, skills and expertise between the study periods, course work and examination results in the (other) degree programme and those in the respective degree programme at the University of Paderborn. This cannot be determined by a schematic comparison, but has to be decided by an overall view and comprehensive evaluation. For any decisions about the equivalence of study periods at and course work and examination results from foreign universities, the agreements of equivalence approved by the “Kultusministerkonferenz” (Conference of the Ministers of Education and Cultural Affairs) and the “Hochschulrektorenkonferenz” (Conference of the Vice Chancellors of the Universities and Universities of Applied Science) as well as any agreements within partnerships with other universities or universities of applied sciences have to be taken into account. Furthermore, if there are any doubts about the equivalence of degrees the “Zentralstelle für ausländisches Bildungswesen” (Central Office of Foreign Education) can be consulted.

(3) For the crediting of study periods and course work and examination results in state-recognized distance study or in any distance learning units, developed by the State of North Rhine-Westphalia in collaboration with other states and the Federal Republic of Germany, (2) applies accordingly.

(4) Failed attempts in equivalent modules in the identical degree programme at other universities or universities of applied sciences or in a related or comparable degree programme at this university or at other universities or universities of applied sciences in the territory of the German Constitution have to be credited ex officio.

(5) Applicants for a degree programme who are entitled to take up the course of studies, due to a classification test according to § 49 Section 12 HG, are credited with the knowledge, skills and expertise shown by the classification test. For the Examination Board, the statements in the certificate from the classification test are binding.

(6) Upon request, any further knowledge and qualifications can be credited based on the documentation provided.

(7) The Examination Board is responsible for crediting according to (1) to (4) and (6). Before any decisions about equivalence are taken the responsible academic representatives of the subject have to be consulted. If crediting is denied, then a justification has to be given.

(8) If course work and examination results are credited, then the marks – where the marking system is comparable – have, after conversion if required, to be transferred and to be included in the computation of the overall mark. If the marking systems are not comparable, the annotation “bestanden” (passed) is taken down. The transfer will be indicated in the certificate.

(9) An examination result or a course work can only be credited once. The students have to provide the necessary documentation for the crediting (in particular, documentation about the knowledge, skills and expertise gained by the examination as well as documentation about the number of attempts and the result of the examination).

§ 14

Absence, Withdrawal, Cheating and Breach of Regulations

(1) The performance in an examination has to be assessed as “mangelhaft” (unsatisfactory) (5.0) if, without cogent reasons, the candidate does not turn up at the date of the examination, or if she or he withdraws from the examination within one week from the date of the examination or after the start of the examination, without giving cogent reasons. The same applies if a written piece of examination is not produced within the given time frame.

(2) The reasons for the absence or withdrawal, given within the one-week period before the date of the examination or given after the start of the examination, must be submitted to the Examination Board in writing without delay but at latest five working days after the examination date and must include convincing evidence. If the candidate has been ill, a medical certificate, containing an assessment of the candidate’s unfitness to sit the examination or containing details allowing the Examination Board to assess candidate’s unfitness to sit the examination, has to be provided. This certificate must be dated no later than the date of the examination. The Examination Board may request confirmation from a public health officer. If the Examination Board does not accept the given reasons, then it will inform the candidate in writing. If the Examination Board does accept the given reasons then any examination results already achieved have to be credited.

(3) If a candidate cheats or attempts to cheat, the respective examination is considered to be marked as “mangelhaft” (unsatisfactory) (5.0) or “nicht bestanden” (failed), respectively. If a candidate takes a resource not allowed by the examiner into the examination, then the respective examination can be marked as “mangelhaft” (unsatisfactory) or “nicht bestanden” (failed), respectively. The incidents are taken on record by the respective invigilator. The appraisal according to clause 1 hereof and the decision according to clause 2 hereof is made by the respective examiner.

(4) A candidate who disturbs the orderly examination process can, usually after being given a warning, be excluded from continuing the examination by the examiner or the invigilator; in this instance, the respective examination is assessed as “mangelhaft” (unsatisfactory) (5.0) or “nicht bestanden” (failed), respectively. The reasons for the exclusion have to be taken on record.

(5) A candidate can request within 14 days that any decisions according to § 14 (3) and § 14 (4) are reviewed by the Examination Board. Incriminating decisions have to be provided with an instruction on right to appeal.

(6) In severe cases, the Examination Board can exclude the candidate from any further examinations. According to HG § 63 (5), acts of cheating can be punished by a fine of up to 50,000 € and can lead to the removal from the register of students.

(7) Upon request of a candidate, the periods of maternity leave as established by the currently valid “Gesetz zum Schutze der erwerbstätigen Mutter (MSchG)” (Maternity Protection Act) for protecting working mothers have to be taken into account accordingly. The necessary documentation has to be attached to the application. The periods of maternity leave intermit any time period specified by these examination regulations; the duration of the maternity leave is not counted as part of such a time period.

(8) Upon request, the periods of parental leave as established by the currently valid “Gesetze über die Gewährung von Elterngeld und Elternzeit (BEEG)” (Federal Child Raising Allowance Act) on the granting of child benefits and parental leave have likewise to be taken into account. At the latest four weeks before the date when she or he wishes the parental leave to start, the candidate must notify the Examination Board in writing, enclosing the necessary proof, for which period or periods she or he wishes to take parental leave. The Examination Board then has to check whether the statutory requirements are fulfilled that would entitle an employee to parental leave according to the BEEG; it notifies the candidate without delay of the outcome and the new examination dates, if applicable. The time period for completing a scientific take-home assignment cannot be intermitted by parental leave. The given assignment is deemed not to have been handed out. After the end of the parental leave, the candidate receives a new topic.

(9) Furthermore the Examination Board establishes the compensation for disadvantages for disabled students and takes into account periods of absence due to caring for the spouse, the registered partner or an immediate relative or a first-degree relative by marriage.

§ 15

Assessment of Examination Results and Marking System

(1) The individual examinations have to be assessed with one of the following marks:

1 = “sehr gut” (very good):	an excellent performance
2 = “gut” (good):	a performance significantly above the average requirements
3 = “befriedigend” (satisfactory):	a performance that meets the average requirements
4 = “ausreichend” (sufficient):	a performance that meets the requirements despite its deficiencies
5 = “mangelhaft” (unsatisfactory):	a performance that no longer meets the requirements because of significant deficiencies

For a more differentiated assessment, interim values between the marks 1.0 and 4.0 can be formed via decreasing and increasing the individual marks by 0.3. This yields the following range of marks: 1.0, 1.3, 1.7, 2.0, 2.3, 2.7, 3.0, 3.3, 3.7, 4.0 und 5.0.

(2) Every module is assessed with a module mark, which is derived from the mark for the final module examination or from the arithmetic mean of the individual marks in the course-related partial examinations. If an examination is assessed by more than one examiner, then the mark is the

arithmetic mean of the individual marks. In computing a mark, only the first position after the decimal point is taken into account; all further positions after the decimal point are deleted without rounding. The results computed in this way correspond to the following marks:

1.0 to 1.5	= "sehr gut" (very good)
more than 1.5 to 2.5	= "gut" (good)
more than 2.5 to 3.5	= "befriedigend" (satisfactory)
more than 3.5 to 4.0	= "ausreichend" (sufficient)
more than 4.0 to 5.0	= "mangelhaft" (unsatisfactory)

II Examination for the Master's Degree

§ 16

Admission to the Examination for the Master's Degree

(1) To examinations in the Master's degree programme in Technomathematics, only those persons can be admitted who are enrolled in the Master's degree programme in Technomathematics at the University of Paderborn or who are admitted as "Zeithörer" (visiting students) according to § 52 HG. These requirements have also to be fulfilled during the examinations.

(2) The application for the Master's thesis has to be filed in writing to the Chair of the Examination Board via the Central Examinations Office. The following documents have to be attached to the application:

1. the proof that the admission requirements according to (1) are satisfied
2. a declaration, whether the candidate is involved in any pending examination procedure
3. a declaration, whether she or he has any irrevocably failed examinations

(3) The admission for the Master's examination has to be refused if

1. the requirements listed in § 16 (1) are not satisfied, or
2. the documentation is incomplete, or
3. the candidate has irrevocably failed an examination in the Master's degree programme in Technomathematics or in a related or comparable degree programme at university or a university of applied sciences in the territory of the German Constitution. For related or comparable degree programmes, the refusal to admit the candidate is limited to the case where an examination has been failed that is compulsory in the Master's degree programme in Technomathematics and that is considered as equivalent, or
4. the candidate is already involved in a comparable examination in an identical, related or comparable degree programme at another university or university of applied sciences.

(4) If it is not possible for the candidate to attach one of the necessary documents, according to § 16 (2), in the manner required, then the Examination Board can allow the candidate to give the proof in a different manner.

(5) Candidates, changing the university or the degree programme, who have failed an examination in a subject within a degree programme, according to § 16 (3) No. 3, that is required for the Master's degree programme in Mathematics, according to § 17, can only be admitted to the respective repeat examination according to § 9.

§ 17

Objective, Scope and Mode of Examination for the Master's Degree

(1) In the examination for the Master's degree, the candidate shall prove that she or he has gained a deepened understanding of concepts and methods in advanced areas of Mathematics and in the technical specialised subject.

(2) The examination for the Master's degree covers subareas of Mathematics. These subareas originate in the following areas

1. algebra and geometry,
2. analysis and stochastics,
3. numerical Mathematics.

The subject Mechanical Engineering or the subject Electrical Engineering can be chosen as specialised subject.

(3) The examination for the Master's degree consists of

1. course-related module examinations corresponding to 78-84 LP from the Master's degree programme in Technomathematics according to the module handbook, where § 17 (4) has to be taken into account. At most 9 LP can be obtained via modules offered in a Bachelor's degree programme, and only if these modules are meaningfully related to the modules selected in the Master's degree programme. In any cases of doubt the Examination Board decides. The "Leistungspunkte" (credits) from a Bachelor's degree programme must not have previously been used for the examination for a Bachelor' degree.
2. course-related module examinations in the „Studium Generale“ (General Studies) corresponding to 6-12 LP, taking into account § 4 (2),
3. the Master's thesis (30 LP).

(4) At least one seminar and one project seminar have to be completed that are not all in the same area (§ 17 (2)). In two of the three areas listed in § 17 (2) at least 9 LP that are not from the Bachelor's degree programme (refer to § 17 (3) clause 2) have to be obtained. At least 12 LP have to be obtained in the specialised subject.

In one of the three mathematical areas, according to § 17 (2), or in the specialised subject, at least 24 LP have to be obtained, including one seminar or project seminar (6 LP).

(5) In the subject informatics, accompanying module examinations, corresponding to 8 LP, have to be completed. The courses have to be selected in the area models and algorithms.

§ 18

Master's Thesis

(1) The Master's thesis shall demonstrate that the candidate has the ability to work on a problem from Mathematics or the specialised subject within a given time frame and using scientific methods. The topic shall be chosen in such a way that it corresponds to a workload of 900 hours. The thesis has to be submitted 8 months after receiving the topic. The thesis shall usually not be any longer than 80 pages in DIN-A4 format.

(2) The Master's thesis can also be written in the specialised subject, if the interlocking with mathematical topics and the additional supervision via the Department of Mathematics are guaranteed.

(3) The Master's thesis may be assigned and supervised by any examiner according to § 12 (2). The candidate must be given the opportunity to submit proposals for the topic of the Master's thesis; however, such proposals do not constitute a claim.

- (4) Upon request, the Chair of the Examination Board ensures that a candidate receives a topic for her or his Master's thesis in due time.
- (5) The Master's thesis may also be permitted as a group project if the individual candidate's contribution to be marked as an examination can be clearly distinguished and marked on the basis of the sections, page numbers or other objective criteria allowing a clear delimitation, and if the requirements of § 18 (1) are fulfilled.
- (6) The topic is handed out by the supervisor by way of the Chair of the Examination Board. The date at which the topic has been handed out has to be recorded.
- (7) The candidate will be notified in writing of the topic and the definition of the project for the Master's thesis. These must be such that the thesis can be completed with the required workload and within the allocated time frame. The topic may be declined only once and only within the first month of allocation. The time frame will start afresh with the assignment of the new topic. On a well-founded request, the Examination Board may extend the time frame for working on the thesis by at most six weeks on an individual basis.
- (8) The Master's thesis, whole or in parts, may not have been prepared for another examination in the same or in another degree programme. A Master's thesis may build on another scientific work, if the part of the thesis that shall be examined is clearly distinguishable from the previous scientific work and can be independently assessed.
- (9) When submitting the Master's thesis the candidate shall declare in writing that she or he has independently written the thesis – or, in the case of a group project, the part of the work indicated accordingly – and she or he has used no resources other than those indicated and has clearly indicated all quotations.

§ 19

Acceptance and Assessment of the Master's Thesis

- (1) The Master's thesis has to be submitted in triplicate to the Examination Board on the due date; the date of the submission has to be recorded. If the thesis is submitted via postal service, the date of the acceptance by the postal service (date of the postmark) is relevant. If the thesis is not submitted by the due date, it is assessed as "mangelhaft" (unsatisfactory) (5.0), according to § 14 (1) clause 2.
- (2) The Master's thesis has to be marked by two examiners, according to § 12. One of the examiners has to be a full-time university professor of Mathematics. If both individual marks are at least "ausreichend" (sufficient), then the rounded arithmetic mean (of the two individual marks) is the mark for the Master's thesis. If both individual marks are "mangelhaft" (unsatisfactory), then this mark is also the mark for the Master's thesis. If one of the two individual marks is at least "ausreichend" (sufficient) and the other one is "mangelhaft" (unsatisfactory), then the Examination Board will request a third assessment and mark by an examiner according to § 12. In this case, the thesis is awarded the mark "mangelhaft" (unsatisfactory) if the third mark is "mangelhaft" (unsatisfactory). Otherwise, the mark for the Master's thesis is the rounded arithmetic mean of the three individual marks, but at least 4.0.
- (3) If the Master thesis has been awarded at least the mark "ausreichend" (sufficient) (4.0), then a colloquium for the Master's thesis will be convened. The colloquium should be no later than 6 weeks after the end of the assessment procedure (for the Master's thesis). The colloquium consists of a talk given by the candidate about the Master's thesis and a discussion. The colloquium for the Master's thesis will be assessed by two examiners, according to § 12, who are usually identical with the examiners of the Master's thesis. The essential topics and results of the colloquium have to be recoded in writing. Subsequent to the colloquium, the candidate has to be informed about the result. If the result of the colloquium is not "ausreichend" (sufficient), then the colloquium can be repeated once. In consultation with the candidate, the Examination Board determines the date for the second attempt. This should happen within the following eight weeks. The Examination Board decides on any well-founded exemptions. If the colloquium has been ultimately failed, then the Master's thesis is also considered to have been failed. In this case, § 20 applies. The colloquium does not count for the overall mark.
- (4) The student has to be informed of the mark for the Master's thesis at latest eight weeks after the submission of the thesis.

§ 20
Second Attempt at the Master's Thesis

(1) If the Master's thesis is assessed to be not "ausreichend" (sufficient) (a mark worse than 4.0), the Master's thesis can be repeated once. A second repeat attempt is not possible. However, giving back the topic of the thesis within the time period listed in § 18 (7) is only admissible, if the candidate did not make use of this option for her or his first thesis.

(2) For the second attempt at the Master's thesis, the candidate can suggest a different examiner.

§ 21
End of the Studies, Overall Mark, Ultimate Failure

(1) The examination for the Master's degree has been passed, if all the chosen elective modules, according to § 17, have been passed, the Master's thesis has been marked as at least "ausreichend" (sufficient) (4.0), if the colloquium talk, according to § 19 (3), has been passed and if 120 LP have been obtained. Only "Leistungspunkte" (credits) are taken into account that have been obtained in the subject Mathematics, the elected specialised subject or in the "Studium Generale" (General Studies).

(2) The overall mark is calculated from the weighted average of the marks for the module examinations in the subject Mathematics, the elected specialised subject and informatics (§ 17 (5)). For the weighting the "Leistungspunkte" (credits) of the modules with a mark are weighted with the factor one, and the "Leistungspunkte" (credits) for the Master's thesis are weighted with the factor one-and-a-half.

This yields the following weights:

1. Module examinations: 78 points for weighting, independently of the actual the LP.
2. Master's thesis : 45 points for weighting.

Marks from the "Studium Generale" (General Studies) do not contribute to the overall mark.

(3) The overall assessment "passed with distinction" is given if the mark for the Master's thesis is 1.0, the overall mark, determined according to § 21 (2), is at least 1.3, and none of the module marks is worse than "gut" (good) (2.0).

(4) The examination for the Master's degree has been ultimately failed if one module examination has been irrevocably failed and there is no possibility of deselection or if the Master's thesis is awarded a mark worse than "ausreichend" (sufficient) (4.0) for the second time.

(5) The notification about an examination for the Master's degree that has been ultimately failed is given to the candidate by the Examination Board in written form. The notification has to include an instruction on right to appeal.

(6) If a candidate has ultimately failed the examination for the Master's degree, upon request, she or he will be issued a written certificate that lists the examinations taken with the respective "Leistungspunkte" (credits) and the marks achieved and that documents that the candidate has ultimately failed the examination for the Master's degree.

(7) Within one year of the removal from the register of students, upon request, students have to be issued a certificate that lists the results of the examinations as well as the number of attempts used for any failed examinations.

§ 22
Supplementary Examinations

(1) Beyond the examinations listed in § 17, students can take examinations for courses or modules, respectively, covering of up to 18 "Leistungspunkte" (credits). The successfully completed examinations are listed in the Transcript of Records.

- (2) Allowing for the upper limit listed in (1), it is possible to rebook for compensation according to § 9
(3). Failed examinations are also counted for the upper limit.
- (3) Examinations that have been taken in the context of the „Studium Generale“ (General Studies) can not be rebooked on principle.

§ 23

Certificate, Transcript of Records and Diploma Supplement

- (1) If the candidate has successfully completed the course of studies, she or he will receive a certificate with the results. This certificate contains the name of the degree programme, the normal duration of the degree programme and the overall mark. The certificate lists the date at which the last examination was taken. Furthermore, it lists the date of issue. The certificate has to be signed by the Chair of the Examination Board.
- (2) Furthermore, the candidate receives a Transcript of Records listing all of her or his achievements and the duration of her or his professional studies. The Transcript of Records includes information on “Leistungspunkte” (ECTS-credits) and the marks awarded in the completed modules and for the Master’s thesis. It also includes the topic of the Master’s thesis and the overall mark for the examination for the Master’s degree.
- (3) Along with the leaving certificate, the graduate is given a Diploma Supplement.
- (4) The Diploma Supplement is an addendum to the certificate in English and German language with standardised information on German university degrees, explaining the German education system and giving a classification of the degree at hand. The Diploma Supplement informs about the completed degree programme and the academic and professional qualifications obtained with this degree.

§ 24

Master’s Degree Certificate

- (1) Together with the certificate for the passed examination for the Master’s degree, the candidate is given the Master’s degree certificate. This document certifies that the candidate is awarded the Master’s degree according to § 2.
- (2) The Master’s degree certificate is signed by the Dean of the Faculty and the Chair of the Examination Board and bears the official seal of the University.

III Final Provisions

§ 25

Invalidity of the Examination for the Master’s Degree

- (1) If a candidate has cheated in an examination and this is only discovered after the certificate has been issued, the Examination Board may retroactively adjust the marks for those examinations in which the candidate has cheated and declare the examination failed where appropriate.
- (2) If the conditions of admission to an examination were not fulfilled without any deceitful intent on the candidate’s part, and if this is only discovered after the certificate has been issued, this deficiency is remedied by passing the examination. If the candidate has intentionally and wrongfully obtained

admission, the Examination Board shall decide on the legal consequences taking into account the "Verwaltungsverfahrensgesetz" (Administrative Proceedings Act) of the State of North Rhine-Westphalia.

(3) The person concerned has to be given the opportunity to make a statement before a decision is taken.

(4) Where appropriate, the incorrect examination certificate has to be withdrawn and a new one has to be issued. Any decision according to § 25 (1) and § 25 (2) clause 2 hereof has to be made within five years from the issue of the examination certificate.

(5) If the examination as a whole is declared to have been failed, the Master's degree has to be nullified and the respective Master's degree certificate has to be withdrawn.

§ 26 Nullifying of the Master's Degree

The Master's degree is nullified if it is retroactively discovered that it was gained by cheating or if essential conditions for its award were mistakenly considered to have been fulfilled. The nullification decision is taken by the Faculty Council with two-thirds of its members.

§ 27 Inspection of the Examination Records

(1) Upon completion of every examination and the examination procedure, the candidate may, upon request, inspect her or his written examination papers, the corresponding examiners' reports and the minutes of the examination.

(2) The application has to be filed with the Chair of the Examination Board within one month from the announcement of the results or issue of the examination certificate. The Chair of the Examination Board decides on the place and date for the inspection.

§ 28 Transitional Rule

(1) These examination regulations apply to all students who have enrolled for the Master's degree programme in Technomathematics in winter semester 2013/14 or thereafter for the first time.

(2) Upon request, students can change to the Master's degree programme in Technomathematics with these examination regulations. Such a change is irrevocable in the sense that it is not possible to change back to the Master's degree programme in Technomathematics with the examination regulations released on 22 October 2008 (AM.Uni.PB 41/08).

(3) Students who have been enrolled in the Master's degree programme in Technomathematics at the University of Paderborn before winter semester 2013/14 can take the examination for the Master's degree including the repeat examination with the examination regulations valid in summer semester 2013 for the last time in summer semester 2016. Any tighter time frames from older transitional rules remain unchanged.

(4) In well-founded cases, the Examination Board can determine special transitional rules, upon request.

§ 29 Effective Date and Publication

(1) These examination regulations become effective on 01 October 2013. The admission requirements according to § 3 become already effective on 01 June 2013.

(2) These examination regulations are published in the "Ämtlichen Mitteilungen der Universität Paderborn (AM Uni. Pb.)" (Official Notices of the University of Paderborn).

Issued based on the decision of the Faculty Council of the Faculty of Computer Science, Electrical Engineering and Mathematics on 22 April 2013 and based on the verification of lawfulness by the Steering Committee on 22 May 2013.

Paderborn, 31 May 2013

President
of the University of Paderborn

Professor Dr. Nikolaus Risch

Attachment I: Degree Course Scheme

Exemplary Degree Course Scheme for Technomathematics with the Master's Thesis Written in the Area Mathematics

Sem.	Maths Area I LP	Maths Area II LP	Maths Area III LP	Specialised Subject LP	Informatics LP	Studium Generale LP	Sum
1	lecture course 9	lecture course 9		lecture course 6		Studium Generale 6	30
2	lecture course 9	lecture course 5		lecture course 6	lecture course 8	Studium Generale 2	30
3	lecture course 9 project seminar 6	seminar 6	lecture course 9				30
4	Master's thesis 30						30
Sum	63	20	9	12	8	8	120

Exemplary Degree Course Scheme for Technomathematics with the Master's Thesis Written in the Specialised Subject

Sem.	Maths Area I LP	Maths Area II LP	Maths Area III LP	Specialised Subject LP	Informatics LP	Studium Generale LP	Sum
1	lecture course 9	lecture course 9		lecture course 6		Studium Generale 6	30
2	lecture course 9	lecture course 5		lecture course 6	lecture course 8	Studium Generale 2	30
3	lecture course 9 seminar 6			lecture course 6 project seminar 6		Studium Generale 3	30
4				Master's thesis 30			30
Sum	33	14	0	54	8	11	120

Attachment II: Module Handbook

As Attachment II, the module handbook forms part of the examination regulations, but it has been published separately (AM.Uni.Pb. 49/13)