

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

Released: 11 December 2015

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 16 September 2014 (GV.NRW. page 547), Paderborn University has issued the following articles:

Note: The following translation of the German "Zweite Satzung zur Änderung der Prüfungsordnung für den Masterstudiengang Technomathematik der Fakultät für Elektrotechnik, Informatik und Mathematik an der Universität Paderborn" (Amtliche Mitteilungen, Ausgabe 102.15 vom 11. Dezember 2015) is offered here for the convenience of our international students. Legally binding is the German version only.

Article I

The examination regulations for the Master's degree programme in Technomathematics at Paderborn University (AM.Uni.Pb. 48/13) released on 31 May 2013, amended via the articles (AM.Uni.Pb. 143/14) released on 24 June 2014, are amended as follows:

1. § 3 Section 2 is rewritten in the following way:

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

1. possess the university entrance qualification certificate (general or relevant subject specific entrance qualification), or possess according to a statutory regulation the entrance qualification certificate for universities of applied sciences, or possess supporting documentation of educational qualification that has been declared to be equivalent via a legislative provision or by the responsible governmental agency, or satisfy the requirements for persons qualified via vocational education, or satisfy the requirements of the "Bildungsausländerhochschulzugangsverordnung".
2. possess a final degree that satisfies the following requirements:
 - a) This final degree has to be a first (and undergraduate) degree with a normal duration of the degree programme of at least six semesters from Paderborn University, or from a state university or state university of applied sciences, or from a state-approved university or state-approved university of applied sciences, or from a state university of cooperative education or a state-approved university of cooperative education. Final degrees from a foreign state university or a foreign state university of applied sciences, or from a foreign state-approved university or a foreign state-approved university of applied sciences, enable admittance (to the Master's degree programme in Technomathematics), provided that there is no significant difference with respect to the acquired competencies to a final degree from Paderborn University according to Clause 1. For foreign educational 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 Sciences) or corresponding legislative regulations have to be taken into ac-

count. Where any agreements or treaties about the equivalence in tertiary education (agreements of equivalence) between the Federal Republic of Germany and other countries benefit students from foreign countries, notwithstanding Clause 2, the regulations provided by the agreements of equivalence have priority. For the rest, if there is any doubt about the existence or non-existence of significant differences, the “Zentralstelle für ausländisches Bildungswesen” (Central Office for Foreign Education) shall be consulted. The decision about the requirements according to Clause 2 is made by the Examination Board.

b) The final degree must include the competencies detailed below, that is, there must be no significant differences to these competencies:

- Linear Algebra: confident handling of
 - vector spaces (basis, dimension, dual space, quotient space),
 - linear maps (rank, eigenvalues, Jordan normal form, diagonalisation),
 - bilinear forms, Euclidean and unitary vector spaces.
- Algebra: confident handling of
 - groups, rings, modules and fields,
 - fundamental proof techniques of Algebra.
- Analysis: confident handling of
 - limits (of sequences, infinite series, functions, sequences of functions),
 - fundamental terms of topology (compactness, continuity),
 - differentiability in one and in more variables,
 - the Lebesgue integral (measure theoretical foundations, theorems of convergence, theorems of Gauß and Stokes),
 - ordinary differential equations (theory of solution, elementary methods of solution),
 - fundamental proof techniques of Analysis.
- Stochastic: confident handling of
 - discrete and continuous random variables, and their distributions and parameters,
 - conditional probabilities, stochastic independence,
 - the central limit theorem and the law of large numbers,

- fundamental methods of mathematical statistics.
- Numerical Analysis:
 - a basic understanding for essential problems of Numerical Analysis,
 - a confident handling of numerical methods,
 - the ability to evaluate the condition of a problem.
- c) The final degree has to include at least 40 LP in one technical, mathematically oriented minor subject.

The decision about the requirements is made by the Examination Board. If requirements are not met, then the enrolment can take place on condition that the requirements have to be fulfilled by an appropriate course of studies and by passing the corresponding examinations up to the moment when the Master's thesis is registered. The decision about conditional enrolment as well as about the type and extent of the course of studies and the examinations is made by the Examination Board, based on the previous final degree. The missing course of studies that still has to be taken must not exceed 30 ECTS. The course of studies should be taken and the examinations should be passed during the first two semesters of the Master's degree programme.

2. § 6 is amended in the following way:

a) Section 1 Clause is rewritten as follows:

“A module is completed with a final module examination. As a prerequisite for participation in the final module examination or for completing the module, evidence of qualified participation according to Section (4) may be required. Further details are regulated by the module descriptions.”

b) Section 4 Clauses 1, 2 and 3 are rewritten as follows:

“As stipulated by the module handbook, evidence of qualified participation is required if this necessary for guaranteeing that competencies are acquired in the module alongside the module examination. Admissible forms of evidence are exercises discussed in the tutorial and homework, course attendance certificates, project work, a written report on a talk or a portfolio. The evidence will not be marked. A qualified participation has taken place, if the performance shows that a more than superficial engagement with the topics on which the task was based has occurred.”

c) Section 5 Clause 1 is rewritten as follows:

“The final module examination has been passed if the given mark is at least “ausreichend” (sufficient).

d) Section 6 Clause 1 is rewritten as follows:

“The modes and modalities of assessment of the final module examination, the form of the evidence of qualified participation as well as the use of a bonus system (including the key given in Section (4)) have to be determined by the Examination Board in consultation with the examiner and have to be published at latest in the first week of teaching.”

e) In Section 7 Clause 1 the words “the “Studium Generale” (General Studies) and” and the word “respectively,” are deleted.

f) The following Section 9 is added:

“(9) In the “Studium Generale” (General Studies) oral or written examinations are taken. These are usually a written examination (of at most 4 hours duration), an assignment (of at most 25 pages), an oral examination (of at most 45 minutes) or a seminar talk (of at most 90 minutes).

In the “Studium Generale” (General Studies) the evidence of qualified participation can, in particular, be provided in the forms listed in Section 4 Clause 2.”

3. § 7 is amended in the following way:

a) In Section 2 the references “§ 12 (2)” are changed to “§ 12”.

b) In Section 5 the words “and the “Studium Generale” (General Studies)” are deleted.

4. In § 8 Section 6 the words “and in the “Studium Generale” (General Studies)” are deleted.

5. § 9 Section 1 Clause 1 is rewritten as follows:

“A module examination has been passed, when the final examination and every course-specific partial examination, respectively, has been passed, that is, the given mark is at least “ausreichend” (sufficient) (4,0). As a prerequisite for participation in the final module examination, evidence of qualified participation according to § 6 (4) may be required.”

6. § 13 is replaced is rewritten as follows:

“§ 13. Recognition of Achievements

(1) Achievements, performed in other degree programmes or in degree programmes at other state universities or state universities of applied sciences, or at

state-approved universities or state-approved universities of applied sciences, or at state universities of cooperative education or state-approved universities of cooperative education, or in degree programmes at foreign state universities or foreign state universities of applied sciences, or at foreign state-approved universities or foreign state-approved universities of applied sciences, are recognised upon request, provided there is no significant difference with respect to the competencies to those achievements that are substituted. The comparison has to be made not schematically but comprehensively with regard to the purpose of recognition for the continuation of the academic studies and the taking of examinations. For the recognition of performances in state-approved distance studies or in distance study units developed by the State of North Rhine-Westphalia in connection with other federal states and the federation Clauses 1 and 2, accordingly, are valid.

- (2) For the recognition of achievements performed at foreign universities or foreign universities of applied sciences, 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 Sciences) as well as agreements within partnerships with foreign universities or foreign universities of applied sciences have to be taken into account. Where any agreements or treaties about the equivalence in tertiary education (agreements of equivalence) between the Federal Republic of Germany and other countries benefit students from foreign countries, notwithstanding Section 1, the regulations provided by the agreements of equivalence have priority. For the rest, if there is any doubt about the existence or non-existence of significant differences the “Zentralstelle für ausländisches Bildungswesen” (Central Office for Foreign Education) can be consulted.
- (3) Based on the recognition according to Section 1, upon request, the Examination Board has to place the student in a semester within the degree programme.
- (4) 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 achievements shown by the classification test. For the Examination Board, the statements in the certificate from the classification test are binding.

- (5) Upon request, any further knowledge and qualifications based on the documentation provided can be credited by the Examination Board if the knowledge and qualifications are, with respect to content and level, equivalent to those achievements that they are supposed to replace.
 - (6) The Examination Board is responsible for the recognition according to Sections 1 to 5. Before any decisions about the existence or non-existence of significant differences or the equivalence are made, the appropriate representatives of the subject have to be consulted. If the recognition is denied, then a justification has to be given.
 - (7) The applicant has to present the information required for the recognition (in particular, about the knowledge and skills acquired by the achievements and about the examination results) in the form specified by the Examination Board. The Examination Board has to decide about any applications according to Section 1 at latest within 10 weeks after all relevant information has been completely presented.
 - (8) The recognition will be indicated in the certificate. If achievements are credited, then the marks, where the marking systems are comparable, have, after conversion if required, to be transferred and to be included in the respective computation of marks. If there is no mark or if the marking systems are not comparable, then the annotation "bestanden" (passed) is taken down.
 - (9) An achievement can only be recognized once. This is also true for the recognition of any other knowledge and qualifications."
7. § 14 is amended in the following way:
- a) Section 2 is rewritten as follows:

"In justified cases, it is possible to withdraw from the examination within the one-week period before the examination date or to withdraw after the begin of the examination. The pleaded reasons for withdrawal must be submitted to the Examination Board in writing without delay but at latest five working days after the examination date and must include evidence. If the candidate has been ill, a medical certificate, dated at latest at the day of the examination, containing an assessment of the candidate's unfitness to sit the examination or containing details allowing the Examination Board to assess the candidate's unfitness to sit the examination, has to be provided. In justified cases, a medical certificate may be requested from a medical examiner. The illness of a child, attested by a

medical certificate, as defined by § 25 Section 5 of the “Bundesausbildungsförderungsgesetzes” (Federal Education and Trainings Assistance Act), is counted as the unfitness of the candidate to sit the examination, if child care cannot be provided in any other way, in particular, if child care is predominantly provided on one’s own. If the Examination Board does accept the given reasons, then the candidate is informed in writing and a new date for the examination is fixed. Any examination results already achieved have to be credited. If the Examination Board does not accept the given reasons, the candidate is informed in writing.”

b) Section 7 is rewritten as follows:

“The special situation of students with family responsibilities during their course of studies and during required achievements and examinations is taken into account. Among other things, this is done in the following ways:

- a) Upon request of a candidate, the protection provisions according to §§ 3, 4, 6 and 8 of the “Mutterschutzgesetz” (Maternity Protection Act) are taken into account. The necessary documentation has to be attached to the application. Considering each individual case, the Examination Board may decide on different modes of assessment. The maternity protection periods intermit any time period specified by these examination regulations; the duration of the maternity protection is not counted as part of such a time period.
- b) Upon request, the periods of parental leave as established by the currently valid “Gesetze über die Gewährung von Erziehungsgeld und Elternzeit” (BERzGG) (Federal Child Raising Allowance Act) 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 evidence, for which period or periods she or he wishes to take parental leave. The Examination Board then checks whether the statutory requirements are fulfilled that would entitle an employee to parental leave according to the BERzGG and schedules dates and time periods based on the individual case. The time period for completing the Master’s thesis can be extended to at most twice the regular time period for completing the Master’s thesis. Else the topic (for the Master’s thesis) is deemed not to have been handed out, and, at the end of the parental leave, the candidate receives a new topic.

- c) Upon request, the Examination Board takes into account times of non-use, due to caring and parenting children, as defined by § 25 Section 5 of the “Bundesausbildungsförderungsgesetz” (Federal Education and Trainings Assistance Act), and times of non-use, due to caring for the spouse, the registered partner, the partner in an informal marriage or an immediate relative or a first-degree relative by marriage, and it schedules dates and time periods based on the individual case. For the rest, Clauses 4 and 5 of Item b) are valid, respectively.”
- c) Section 8 is deleted.
- d) Section 9 becomes now Section 8 and is rewritten as follows:
 “Furthermore the Examination Board establishes the compensation for disadvantages for disabled students.”
8. § 16 is amended in the following way:
- a) The following Section 2 is inserted:
 “(2) Subject to the available capacities and upon submitting a request to the Examination Board, students of the Bachelor’s degree programme in Technomathematics that
1. have obtained at least 151 “Leistungspunkte“ (LP) in their Bachelor’s degree programme that are relevant for completing their Bachelor’s degree programme,
 2. have successfully completed all module examination of the “Basisstudium” (basic academic studies) of the Bachelor’s degree programme in Mathematics,
 3. have obtained at least 30 “Leistungspunkte” (LP) in the “Aufbaustudium” (advanced academic studies) of the Bachelor’s degree programme in Mathematics
- may, in excess of Section 1, be admitted for one semester to modules of the Master’s degree programme in Mathematics to the extent of at most 30 “Leistungspunkte” (LP). This regulation can be used once only. A repeat examination of a failed Master’s examination taken in advance can only take place after enrolment in the Master’s degree programme in Mathematics. Students are not entitled to admittance to the Master’s degree programme in Mathematics at a later date.
- b) Section 5 is deleted.

- c) The former Sections 2 to 4 become Sections 3 to 5.
9. § 17 Section 3 is amended in the following way:
- a) In Item 1 the word “module examinations” is replaced by “final module examinations”.
 - b) Item 2 is rewritten as follows:

“2. a course-related final module examination in the “Studium Generale” (General Studies) corresponding to 6 to 12 LP. The final module examination consists of some form of assessment. By choice, the candidate may take an additional examination in another course. In those courses in which no assessment takes place evidence of qualified participation has to be provided.”
10. § 21 Section 2 is rewritten as follows:
- “The overall mark is calculated from the weighted average of all module examinations that have been assessed with a mark. For the weighting, the “Leistungspunkte” (LP) of the modules assessed with a mark are weighted with the factor one and the “Leistungspunkte” (LP) for the Master’s thesis are weighted with the factor one and a half.
- This results in following weights:
1. module examinations (except “Studium Generale” (General Studies)): 78 weighted points, regardless of the actual LP,
 2. Master’s thesis: 45 weighted points,
 3. “Studium Generale” (General Studies): 3 weighted points, regardless of the actual LP.”

Article II

These articles of amendment become effective on 1 December 2015. Notwithstanding, the amendments according to Article I, No. 2 e) and f), No. 3, No. 4, No. 9 and No. 10 are only valid for students that enrol in the Master’s degree programme in Technomathematics at the Faculty of Computer Science, Electrical Engineering and Mathematics from summer semester 2016 onwards.

These articles of amendment will be published in the “Amtliche Mitteilungen der Universität Paderborn (AM.Uni.Pb.)“ (Official Notices of Paderborn University).

Issued based on the decision of the Faculty Council of the Faculty of Computer Science, Electrical Engineering and Mathematics on 19 October 2015 and after the verification of lawfulness by the Steering Committee on 11 November 2015.

Paderborn, 11 December 2015

President

of Paderborn University

Professor Dr. Wilhelm Schäfer