

**Faculty for  
Electrical Engineering, Computer Science and Mathematics**

**Examination regulations  
for the Masters degree course in Computer Science  
at the University of Paderborn**

**Note: The following translation of the German examination regulations for the Masters degree course in Computer Science is offered here for the convenience of our international students. Legally valid is the original German version only.**

**Draft of the new Masters degree course, starting in the winter semester 2009/2010  
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Based on §2 section 4 and §94 section 1 of North-Rhine Westphalia's Tertiary Institutions Act (Gesetz über die Hochschulen des Landes Nordrhein-Westfalen, also known as Hochschulgesetz – HG) of March 14, 2000 (GV. NRW. p. 190), last amended on January 28, 2003 (GV. NRW. p. 36), the University of Paderborn issued the following examination regulations:

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## I. General Issues

### § 1

#### **Purpose of the examinations, admission, goals and duration of the course**

- (1) The Masters examination provides the student with a second degree, bestowing professional qualification after studies in Computer Science. The Masters degree course takes 4 semesters.
- (2) Prerequisites for the Masters degree course in Computer Science are
  1. the University Entry Certificate (University Entry--general or respective subject-related University Entry), or a certificate recognized as equivalent by law or by a competent public institution, or a qualification through respective vocational training,
  2. a first degree bestowing professional qualifications, either from the Bachelors course in Computer Science at the University of Paderborn, or from an equivalent or comparable research-oriented degree course in Computer Science or a comparable degree course. As a rule, the grade must be at least a 3.0 or the equivalent as determined by the examination committee. For graduates of comparable degree courses, the examination committee decides in consultation with the candidate which additional examination elements the student must pass as an additional prerequisite for admission.
  3. adequate language abilities as stipulated in sections 5 and 6.
- (3) The Masters examination determines whether the students have broadened their professional skills gained during a preceding Bachelor course and have deepened their knowledge in selected areas such that they are able to solve problems by applying suitable scientific methods of computer science, and are able to develop them further in their area of specialization (major). An adequate oral and written command of the English language in a professional context is also a requirement in regard to professional skills in Computer Science.
- (4) Apart from the general course goals of § 81 HG, the Masters course provides the students with the ability to apply and extend the scientific methods of Computer Science in their work and to act responsibly with regard to the effects of technological change.
- (5) A further prerequisite for the Masters degree course in Computer Science is adequate knowledge of the German language according to § 49 sec. 12 HG regarding the current regulations concerning the German language examination for the University of Paderborn and furthermore knowledge of the English language substantiated by attestations or other documentation such as the
  1. successful completion of a minimum of 5 years of English from the 5<sup>th</sup> grade on - e.g. residents of Germany - or
  2. language examination at a comparable level with TOEFL 550 (paper and pencil) or TOEFL 79 (internet-based) or
  3. comparable knowledge (e.g. Cambridge First Certificate, grade "B")
- (6) For those who do not have the required knowledge of German but do possess a well-founded knowledge of English which can be substantiated by attestations or other documentation such as
  1. a Bachelors degree from an English-speaking country\* or acquired during a course of study at an English-speaking domestic accredited institution or

\* In accordance with these regulations that would be Australia, Great Britain, Ireland, Canada, New Zealand and the United States of America

2. a language examination at a comparable level with TOEFL 550 (paper and pencil) or TOEFL 79 (internet-based) or
  3. comparable knowledge (e.g. Cambridge First Certificate, grade "A")
- (7) Before completing their Masters course, students who have fulfilled prerequisites in compliance with section (6) must attest their knowledge of German at a level of A2 **CEFR** (*Common European Framework of Reference for Languages*). This can be acquired through the university German courses which last 240 hours within the course of "Studium General" and have a maximum total of 14 ECTS points.

## §2 Academic degree

Upon successfully passing the Masters examination, the Faculty for Electrical Engineering, Computer Science and Mathematics bestows the academic degree "Master of Science," abbreviated as "M.Sc." If the performance in the examination has in accordance with § 16 sec. 6 been sufficiently tested in the English language then the academic degree will appear as "English Master of Science" on the respective certificate issued.

## § 3 Regular course duration, extent of the course and course regulations

- (1) Earning the Masters degree normally requires four semesters, including the Masters examination. The nominal total workload for a student is 120 credit points.
- (2) The degree course consists of modules with a total of 120 credit points. Only mandatory elective modules are offered.
- (3) All students must attend modules and sit the respective exams in English in their major course of study, a minimum of 24 credit points
- (4) There could be a slight limitation in the choice of courses when the Master course Computer Science is to be completed entirely in the English language. The same applies when the courses required in section 3 are only chosen in English.
- (5) The specified credit points correlate with those stipulated in the framework of the European Credit Transfer Systems (ECTS). One credit point is equivalent to a workload of on the average 30 hours.
- (6) Based on these examination regulations, the Faculty for Electrical Engineering, Computer Science and Mathematics issues course regulations, an example course schedule, and module descriptions. These documents provide details about the aims of the individual modules and the classes that are assigned to the modules. Key skills are taught in particular during the project group and the seminars. The example course schedule and the module descriptions are attached to these examination regulations.
- (7) The contents of the classes are selected such that the workload prescribed by the credit points is taken into account.
- (8) The Masters degree course requires at least 12 credit points for general studies "Studium Generale" and an elective minor area of study. In the optional minor area of study, the examination modes must be in accord with §5 section 1. The exams in courses in general studies should be completed according to § 5 section 1 or awarded credit points for partial completion in accordance with § 5 section 1.

#### **§ 4 Modularization**

- (1) The Masters degree course in Computer Science is offered in modules that are individual, self-contained, examinable qualification units. They are integrated with respect to their content and duration and have credit points attached. Modules are completed by successfully passing of a module examination for which grades and credit points are awarded.
- (2) Aside from the project group and thesis modules (30 credit points each) and the “general studies” and elective minor area of study (together a minimum of 12 credit points) the Masters degree course is divided into 6 mandatory modules (8 credit points each)
- (3) If a module includes mandatory elective classes, these can be chosen from the module catalog, which is part of the module description.

#### **§ 5 Examinations and examination deadlines**

- (1) Except for the final module examination and the project module, a module examination consists of an oral examination according to § 7 and if applicable, contributing performances or partial examinations. Modes of examination allowed are written examination in compliance with § 6, oral examination in accordance with § 7, active participation in tutorials or project work and written homework assignments. Any other examination forms must be approved by the examination committee. In all cases the examinations must be appraisable as an individual performance.
- (2) A module exam is successfully passed if the final oral exam and all or some previously determined contributing performances or exams were passed with at least “sufficient(4.0)” The grade for the module examination is determined through an average of previously determined portions from the grades of the final oral exam, if that has been arranged, and the grades of the partial examinations and alternative forms.
- (3) The module grade can be improved (“bonus system”) through active participation in tutorials or projects or through preparation of written assignments which have been defined by a previously determined scheme. Conversely, a grade can be lowered (“penalty system”) when there is a lack of participation in tutorials or projects or deficient preparation of written homework as defined in a previously determined scheme. Passing the module exam itself may neither be influenced by a bonus nor a penalty system.
- (4) The examination types and modalities for the final module examinations including partial examinations as well as registration and deregistration deadlines and the options for repeat examinations or rework of contributing performances and the decision to implement bonus or penalty systems must be determined and published at the latest within the first three weeks of the lecture period in which the first course of a module begins. This must be made public on appropriate sites in internet and with blackboard (public) postings.
- (5) For courses in the optional elective minor subject area, the pertinent exam regulations should govern registration, deregistration, withdrawal, cheating, violation of regulations, assessing exam results and allocating credit points. Where necessary the allocation of credit points should be determined by the particular examination committee.
- (6) Should a candidate credibly prove (doctor’s certificate) that he/she is not in a position to sit or partially sit the exam in the intended form because of continued illness or physical handicaps, then the chairperson of the examination committee must provide the candidate with an alternative examination possibility as equal as possible to the original.

## **§ 6**

### **Written examinations**

- (1) In written examinations, the candidate should show that she or he is able to identify problems in the subject area and is able to solve them within a given time by using the common methods and the aids permitted by the examiner.
- (2) Each written examination must be assessed by an examiner according to § 11. In accordance with § 11 at least two examiners must assess the results of written examinations that are requirements in a degree course and/or when it is the last possible repeat of an examination. One of the examiners may in accordance with § 11 have the qualification of an assessor.
- (3) As a rule, written examinations have a duration of at the least 60 minutes and at the most 240 minutes.
- (4) The grades for written examinations must be made known to the students after no more than six weeks.

## **§ 7**

### **Oral Examination**

- (1) In the oral examinations, the candidate should show that she or he recognizes the context of the subject and is able to put specific examination questions into this context. The oral examination also determines whether the candidate has a broad knowledge of scientific methods in Computer Science.
- (2) Oral examinations are either directed by two examiners (cooperative examination) or by a single examiner in the presence of a competent assessor compliant with § 11 and are held as individual or group exams. Before the grade is determined, the examiners consult with each other, or the examiner consults the assessor in the absence of the candidate.
- (3) Oral examinations last at least 15 minutes and not more than 60 minutes per candidate.
- (4) The significant topics and results of the examination must be recorded in the minutes. The result of the examination must be disclosed to the candidate immediately after the oral examination.
- (5) Unless a candidate disagrees, students who intend to sit the same oral examination at a later date are admitted as listeners subject to space availability. The admission does not include the discussion and disclosure of the examination result

## **§ 8**

### **Compensation and repetition of examinations**

- (1) Each examination can be repeated twice.
- (2) Students cannot repeat an examination that they have passed.
- (3) A successfully passed examination in an auxiliary area according to § 21 can at a candidate's request be exchanged (compensation) for a passed or not yet passed (final pass) examination or an ultimately failed examination if these exams are in principle comparable.
- (4) A module has been successfully completed if the final grade is at least "(4.0) sufficient". A candidate has passed a module examination if each class-related partial examination has been assessed at least as "sufficient".

- (5) A module has been failed when the module examination or course-related mandatory partial examination was failed or when an elective partial examination was failed and cannot be compensated for according to section 3.

## **§ 9**

### **Registration and examination deadlines**

- (1) Each module requires separate registration. Normally this is achieved by registering for the first examination in a module. A written application for admission to the Masters examination must be submitted together with the registration for the first module. Registration is only permitted if the student meets the admission prerequisites according to §15.
- (2) Registration for written examinations according to § 5, section 1 takes place within specified deadlines at the central examination registrar's office. The registration deadlines are either published at the beginning of or during the official lecture period. Organizers of oral examinations according to § 5 sec. 1 are awarded a time slot of three weeks (block examinations) during which the individual exams take place. Registration for oral exams in accordance with §5 sec. 1 that are not blocked (individual oral examinations) takes place at the central examination registrar's within 14 days (at the latest) before the examination day.
- (3) The examinations may be attempted as soon as the prerequisites for admission have been established.
- (4) Deregistration from written or individual examinations can take place at the central examination registrar's up to one week before the respective examination date, no reasons need be given. Deregistration from block examinations in accordance with sentence 1 can only be accepted at the latest one week before the block examinations start.
- (5) The Masters thesis is an exception to these regulations, here the academic advisor determines registration and deregistration.
- (6) The Central Examination Registrar establishes the registration and deregistration modalities. An on-line procedure can be specifically applied.

## **§ 10**

### **Examination committee**

- (1) The Faculty Council of the Faculty for Electrical Engineering, Computer Science and Mathematics forms an examination committee for the Bachelor and Masters degree courses in Computer Science. This committee
- organizes the examinations and supervises their implementation,
  - ensures that the examination regulations are followed and observes the agreed upon procedural rules for implementing the examinations,
  - decides the appeals against decisions made during the examination procedure,
  - prepares an annual report to the Faculty Council on the development of the examinations and the duration of studies,
  - performs any other tasks explicitly assigned it in these regulations.

In addition, this examination committee determines when examination and course regulation reform is needed and publicizes grade distribution. The examination committee may authorize its chair to dispense with its obligations in all routine cases; this does not apply to decisions about appeals and the report to the Faculty Council. The chair reports to the

examination committee about the decisions made on its behalf.

- (2) The examination committee consists of the chair, the deputy chair, and five additional members. Based on nominations from the respective group, the chair, the deputy chair and two further members come from the professorial group, one member comes from the scientific (sub-professorial) staff group, and two members come from the student group. All are elected by their respective groups to the Faculty Council. The tenure of the members from the professorial group and that of the scientific (sub-professorial) staff is three years; the tenure of students is one year. Re-election is permitted.
- (3) The examination committee holds legislative authority on administrative procedures and administrative court proceedings.
- (4) A quorum for the examination committee consists of the chair or the deputy chair, two further professors, and at least one further member with voting rights. The examination committee reaches its decisions with a simple majority vote with the chair holding the casting vote. The student members of the examination committee have only an advisory role in educational or scientific decisions. This limitation applies in particular to assessing, recognizing, or crediting study and examination performances; specifying examination questions; and appointing examiners and assessors.
- (5) The chair summons the examination committee upon need. However, the chair must summon it upon the request of at least three members.
- (6) The meetings of the examination committee are not public. The members of the examination committee, their deputies, and the examiners and assessors are subject to official confidentiality. If they are not public employees, they must assure the chair that they will abide by the confidentiality requirements.
- (7) The members of the examination committee have the right to be present while an examination is being conducted.

## **§ 11**

### **Examiners and assessors**

- (1) The examination committee appoints the examiners and assessors. The committee can assign the power of appointment to its chair. Examiners include professors, junior professors, private or university lecturers, and qualified assistant professors (habilitation) and scientific (sub-professorial) staff with habilitation. Scientific (sub-professorial) staff with doctoral degrees who have carried out independent teaching in the respective subject in the course phase to which the examination relates are usually also appointed as examiners. A person may only be appointed as an assessor if he or she has passed a Diplom or Masters examination in a computer science degree course at a tertiary scientific institution governed by the Higher Education Framework Act (Hochschulrahmengesetz) or a comparable examination.
- (2) The examiners are independent in their examination work.
- (3) The candidate may suggest examiners for the thesis and - if several possible examiners are available - also for oral examinations. If possible, the suggestions of the candidate should be taken into account. However, this privilege does not constitute an entitlement.
- (4) The chair of the examination committee ensures that the names of the examiners are made known to the candidate in due time. Generally, this means four weeks but in any case at least two weeks before the date of the respective examination. A public posting suffices.



**§ 12**  
**Crediting of examinations, admission to higher stage semesters**

- (1) Examination performances in comparable degree courses at other tertiary scientific institutions governed by the Education Framework Act (Hochschulrahmengesetz) are credited. This accreditation also applies to comparable examination performances achieved additionally as part of a first degree bestowing professional qualifications. The examination committee determines the comparability of the degree course and/or the examination performances.
- (2) Examination performances in other degree courses or at non-scientific tertiary institutions governed by the Higher Education Framework Act (Hochschulrahmengesetz) are credited if they are determined to be equivalent. Examination performances that have been achieved at tertiary institutions not governed by the Education Framework Act (Hochschulrahmengesetz) are credited upon application if they are determined to be equivalent. Equivalence is to be assumed if the content, scope, and requirements of the examination performances correspond essentially to those of the respective degree course at the receiving tertiary institution at which the student continues to study. This accreditation need not be based on a schematic comparison, but on comprehensive observation and evaluation. Determining the equivalence of examination performances at tertiary institutions abroad follows the equivalence agreements endorsed by the Education Ministers' Conference (Kultusministerkonferenz) and the Heads of Tertiary Institutions' Conference (Hochschulrektorenkonferenz). This accreditation also applies to agreements that are part of partnership agreements between tertiary institutions. If there are doubts about the equivalence, the Central Office for Foreign Education Systems (Zentralstelle für ausländisches Bildungswesen) may be consulted.
- (3) Section 2 applies accordingly to crediting examination performances from state-approved extramural studies or extramural study units developed by the state of North-Rhine Westphalia in co-operation with other states and the federal government.
- (4) Course applicants who are entitled to take up their studies in an advanced semester based on an entry assessment examination according to § 67. HG are awarded credits toward their examination performances for the knowledge and abilities demonstrated in the entry assessment examination. The certificate assessment reporting the entry assessment examination is binding for the examination committee.
- (5) Upon application, the exam results and credit points from partial performances will be awarded to "Studium Generale" (general education courses) requirements.
- (6) The examination committee awards credits mentioned in sections 1 to 5. Before equivalence is assessed, the examination committee consults competent representatives from the subject area.
- (7) If the examination committee awards credits for examination performances, the grades must be adopted, if the grade scales are comparable. With the exception of courses in "Studium Generale" the grades must be incorporated into the calculation of the overall grade. If the grading system is not comparable, the comment "passed" is included. The award of credits is indicated on the certificate.
- (8) If the conditions in sections 1 to 5 are met, the applicant is legally entitled to an award of credits. Examination performances that have been completed within the area governed by the Higher Education Framework Act (Hochschulrahmengesetz) are credited by law. The students must present the documents necessary for the award of credits, in particular those relating to class content and examination conditions, the number of examination attempts, and the examination results.

- (9) Upon application, students leaving the tertiary institution without a final degree receive a certificate describing their total examination performances.

### **§ 13**

#### **Missed examinations, withdrawal, cheating, violation of regulations**

- (1) Examination performance is assessed as "unsatisfactory" (5.0) if the candidate fails to appear at an examination without proper cause. This assessment also applies if he or she withdraws from the examination without proper reason after the start of the examination or within the week prior to the respective examination date. The same applies if the candidate fails to deliver a written examination performance within the specified timeframe.
- (2) Reasons claimed for missing the examination, for withdrawing during the week before the respective examination date, or for withdrawing after the start of the examination must be presented to the examination committee without delay, at the latest five working days after the date of examination in writing and they must be substantiated.  
In the case of illness, the candidate must submit a medical certificate dated no later than the day of the examination. It must contain enough information so that the examination committee can determine the candidate's ability to take an examination. In justified cases, a medical certificate from a state-appointed physician must be presented. If the examination committee accepts the reasons, they report this decision in writing to the candidate and to the examiner. The examination committee will credit the examination results that have already been achieved in this case.
- (3) If a candidate attempts to influence the result of his or her examination performance by cheating, e.g., by using aids that are not permitted, the examination committee will assess the respective examination performance as "unsatisfactory (5.0)". The respective examiner or supervisor will determine whether or not a candidate has cheated and this decision is put on file. A candidate who disrupts the orderly conduct of the examination may be excluded by the respective examiner or supervisor from the remainder of the examination. This action is usually preceded by a reprimand. In such cases, the examination performance is assessed as "unsatisfactory (5.0)". The reasons for the disqualification must be recorded on file. In severe cases, the examination committee may exclude the candidate from further participation in examinations.
- (4) Within 14 days the candidate can demand that decisions made according to section 3 be reviewed by the examination committee. Unfavorable decisions made by the examination committee must be immediately communicated to the candidate in writing. The examination committee must explain their reasons and must provide instructions to the candidate on his or her right to appeal. Before the decision, the candidate must be given the opportunity to present his or her explanation of the situation.
- (5) Upon a female candidate's application, the examination committee must take into account the maternity protection periods as they are specified in the Working Mothers Protection Act (Gesetz zum Schutze der erwerbstätigen Mutter, MSchG) effective at the time of application. The application must be accompanied by the required supporting documentation. The maternity protection periods interrupt any time limit set by these examination regulations. The duration of the maternity protection is not included in any deadlines.
- (6) The examination committee must likewise take into account the time limits of parental leave upon application as specified in the respectively applicable Child Education Benefit and Parental Leave Award Act (Gesetz über die Gewährung von Erziehungsgeld und Erziehungsurlaub, BErzG). The candidate must notify the examination committee in writing about the time period(s) of parental leave he or she intends to take. The examination committee must receive this notification no fewer than four weeks before the intended start of the parental leave and it must include the required supporting documentation. The examination committee must establish whether the legal prerequisites have been met that would entitle an employee to parental leave under the BErzG. The examination committee

promptly informs the candidate about the outcome and, where applicable, about the new examination deadlines. Deadlines for scientific homework cannot be interrupted by parental leave. The assigned task is withdrawn and regarded as not assigned. After the end of parental leave, the candidate is given a new topic.

## **§ 14**

### **Examination performance assessment and grading**

- (1) The individual examination performances must be assessed as one of the following grades:

1 = very good:	an excellent performance
2 = good:	a performance significantly above the average requirements
3 = satisfactory:	a performance that meets the average requirements
4 = sufficient:	a performance that meets the requirements in spite of its deficiencies
5 = unsatisfactory:	a performance that no longer meets the requirements because of significant deficiencies

For a differentiated assessment, the examination committee may create intermediate values between the grades 1.0 and 4.0 by lowering or lifting the individual grade by 0.3. This results in the following range of grades: 1.0, 1.3, 1.7, 2.0, 2.3, 2.7, 3.0, 3.3, 3.7, 4.0, 5.0.

- (2) If an examination performance consists of partial examinations, the grade is determined as a weighted average of the individual grades. If the examination performance is assessed by several examiners, the grade is computed as the arithmetic average of the individual grades. For the calculation, only the first decimal digit is taken into account. All subsequent digits are dropped without rounding.

The results calculated in this manner correspond to the following grades:

1.0 to 1.5	= very good
greater than 1.5 to 2.5	= good
greater than 2.5 to 3.5	= satisfactory
greater than 3.5 to 4.0	= sufficient
greater than 4.0 to 5.0	= unsatisfactory

## **II Master Examination**

## **§ 15**

### **Admission to the Masters examination**

- (1) Only students who are enrolled at the University of Paderborn in the Masters degree course Computer Science, or who have been admitted as guest students (Zweithörer) according to § 71, section 2 HG may be admitted to the Masters examination.
- (2) Candidates must apply in writing for admission to Masters examination at the office of the examination registrar. The examination committee reviews the application. The application must include the following:
1. evidence showing that the candidate has met the admission requirements described in section 1,
  2. where applicable, a declaration expressing objections to admitting listeners to the examination,
  3. a declaration stating whether the candidate has already failed or ultimately failed a Masters examination or a diploma examination in a degree course in Computer Science, Computer Engineering, Business Computing or another degree course,

or the candidate has forfeited his or her entitlement to an examination by missing a deadline for a repeat examination, or the candidate is involved in another examination procedure.

- (3) The application for admission must be accompanied by a preliminary registration for the first module examination. This registration is considered to be final unless the candidate withdraws it at least 7 days before the date set for the examination. The examination committee and the examiners must be informed about the withdrawal. The withdrawal option applies respectively to registrations for further examinations.
- (4) Admission to the Masters examination is refused, if
  - a) the prerequisites specified section 1 are not fulfilled, or
  - b) the documents are incomplete, or
  - c) the candidate has ultimately failed the Masters examination in a degree course in Computer Science, Computer Engineering, Business Computing, or in a comparable or related degree course at a tertiary scientific institution governed by the Higher Education Framework Act (Hochschulrahmengesetz), or
  - d) the candidate is involved in an examination procedure at another university in a degree course in Computer Science, Computer Engineering, or Business Computing, or
  - e) the candidate has forfeited entitlement to an examination.
- (5) If the candidate is not in a position to supply a document according to section 2 sentence 2 in the prescribed manner, the examination committee may permit the candidate to supply the proof in a different form.
- (6) Students who have changed tertiary institution or degree course and have failed the examination in a subject of a degree course according to section 4 c), which according to § 16 must be passed for the Masters degree course in Computer Science, may only be admitted to the respective repeat examination according to § 20.
- (7) Usually, the elective subject (minor) must be a subject that the candidate studied as part of the first degree. The candidate may petition the examination committee for an exception which the committee then decides. The candidate establishes the elective subject by registering for the first examination in this subject. The candidate registers his or her participation in a written examination in the elective subject with the examination committee at least two weeks prior to the respective examination date.

## **§ 16**

### **Goal, extent, and format of the Masters examination**

- (1) By means of the Masters examination, the candidate should show that he or she has gained a broad range of general scientific knowledge in computer science and is thus able to carry out independent scientific work.
- (2) The Masters examination covers the following subject areas:
  - 1. Software Technology and Information Systems
  - 2. Models and Algorithms

3. Embedded Systems and System Software
4. Human-Computer-Interaction, and
5. one elective subject selected by the candidate.

Subjects 1 to 4 are in the following referred to as computer science subject areas.  
Candidates must select one of these subject areas as an area of specialization (major).

(3) Candidates can choose the following subjects as standard electives (minors):

1. Electrical Engineering
2. Mechanical Engineering
3. Mathematics
4. Economics
5. Media sciences
6. Psychology

For each of these elective subjects, there is an elective-subject agreement including a coordinated range of classes, which are attached to these examination regulations. The timetables are co-coordinated.

The minors (standard elective subjects) Electrical Engineering and Economics guarantee an adequate and comprehensive catalog of courses in English.

In individual cases the examination committee, can, pending application, permit a different subject as a standard elective subject. In this case, it determines which examinations the candidate must take and informs the applicant.

(4) The Masters examination consists of

1. three accompanying module examinations in the mandatory elective area amounting to 8 credit points, taken in the major during the course of the module with its prevailing catalog,
2. the project group module (30 credit points)
3. three module examinations taken during the candidate's studies in the mandatory elective modules of the other three computer science subject areas that are not specialization areas, each accounting for 8 credit points.
4. the Masters thesis (30 credit points), including a planning phase ( 5 of the 30 credit points), a presentation and a scientific disputation of about 45 minutes duration,
5. examinations in an optional elective subject or proof of achievement in courses for general studies "Studium Generale" accounting to at least 12 credit points.

(5) Modules and their respective examinations in the mandatory elective subject (major) consisting of at least 24 credit points must be passed in the English language. Within the framework of these regulations, this means that lectures and respectively their material must be in English and at least one third of the respective examinations must take place in the English language.

(6) The certificate described in § 2 sentence 2 concerning the graduation title "English Master of Science" is granted if

1. examination according to section 4 no. 4 (module final examination) has been completely passed in the English language and
  2. work described in section 4 no. 1 - 3 (mandatory elective module), with the exception of module and exams with at the most 16 credit points, and the respective work in section 5 have been passed in the form described.
- (7) In the module examinations described in section 4, no. 1 and 3, the content of the modules amounting to 8 credit points each is examined. These modules may be selected from the following catalogs that are part of information science subject areas mentioned:
1. Module Catalog Software Technology and Information Systems:
    - 1.1 Model-based Software Development
    - 1.2 Languages and Programming Methods
    - 1.3 Databases and Information Systems
    - 1.4 Knowledge-based Systems
    - 1.5 Analytical Methods of Software Engineering
    - 1.6 Constructive Methods of Software Engineering
  2. Module Catalog Models and Algorithms:
    - 2.1 Algorithms I
    - 2.2 Algorithms II
    - 2.3 Computability and Complexity
    - 2.4 Algorithms in Computer Networks
    - 2.5 Codes and Cryptography
    - 2.6 Optimization
  3. Module Catalog Embedded Systems and System Software:
    - 3.1 Distributed Computer Systems
    - 3.2 System Software
    - 3.3 Computer Networks
    - 3.4 Embedded Systems
    - 3.5 HW/SW-Codesign
    - 3.6 Embedded and Real-Time Systems
  4. Module Catalog Human-Machine Interaction:
    - 4.1 Computer Graphics and Visualization
    - 4.2 Computer Science and Society
    - 4.3 Concepts of Digital Media
    - 4.4 Computer-supported Cooperative Collaboration and Learning
    - 4.5 Development of User Interfaces
    - 4.6 Human-Machine Interaction

Apart from the compulsory seminar that is part of the project group, candidates must take at least one seminar in one of the mandatory elective classes offered in their module of the area of specialization (see section 4 no. 1). In one mandatory elective module (section 4, no. 3) at most a further mandatory elective class can be a seminar.

- (8) In the elective subject, candidates must take the subject and module examinations relating to classes accounting for 12 credits or in general studies ("Studium Generale") complete examinations and contributing performances relating to classes accounting for 12 credit points. More information about standard elective subjects can be found in the attachment. By admission according to § 1 sec. 6 the required German courses can be accepted as credit for general studies "Studium Generale" according to section 4 no 5. Courses in computer science cannot be accredited to general studies "Studium Generale".

## **§ 17 Thesis**

- (1) The thesis module consists of the work planning phase (5 credit points, not graded) and the Masters thesis, which includes a presentation and a scientific disputation (25 credit points).
- (2) The Masters thesis is an examination work that concludes the scientific education. In it the candidate should show that he or she has the ability to process a problem in Computer Science according to scientific methods, within a certain deadline. The task is to be designed so that it corresponds to a workload of 5 months full-time work. The thesis should normally not exceed 120 DIN A4 pages.
- (3) The Masters thesis can be given and supervised by any examiner under § 11. Upon application by the candidate, the examination committee may also approve authorized examiners who teach in the elective subject selected of the candidate to supervise the Masters thesis. In this case, the examination committee appoints at the beginning of the thesis work a second examiner from the Computer Science staff with whom the working plan must be coordinated. The candidate must be given the opportunity to suggest a topic for the Masters thesis. These suggestions do not constitute an entitlement.
- (4) Upon application, the chair of the examination committee ensures that a candidate is given a topic for the Masters thesis on time.
- (5) The Masters thesis may also be approved in the form of group work, provided the individual candidate's contribution is clearly distinguishable in terms of individual sections, number of pages or other objective criteria that permit unambiguous discrimination and assessment and it fulfils the requirements under section 2.
- (6) The Masters thesis cannot be commenced until module examinations amounting to 54 credit points have been successfully passed and the work plan has been accepted in writing by the supervisor. The chair of the examination committee issues the topic of the Masters thesis immediately after the work plan has been accepted. The date of issue must be recorded and placed on file.
- (7) The topic and the task of the Masters thesis are sent to the candidate in writing. They must be formulated such that the envisaged workload is sufficient. The topic may be returned only once and only within the first month after it has been issued. The work period starts anew on a new topic after the new work plan has been accepted. In individual cases and upon justified application, the examination committee can grant a work period extension of no more than six weeks.
- (8) The work plan must include the following elements: a description of the thesis topic, the motivation behind the thesis, an exact phrasing of the goals, a description of the methods to be applied to reach those goals including a respective time schedule as well as draft of the provisional outline for the written script.
- (9) Neither the Master thesis nor any part thereof may be used in an examination in this or any other course of study.

- (10) Upon submission of the Masters thesis, the candidate must declare in writing, that the work - or in the case of group work, the relevant section of the work, has/have been written independently, that no other sources than those specified have been used as support, and that citations have been marked as such. The work plan must be submitted with the thesis.

## **§ 18**

### **Acceptance and assessment of the Masters thesis**

- (1) The Masters thesis must be delivered to the examination committee on or before the deadline; the date and time of submission must be recorded and placed on file. If the work is submitted by mail, the delivery date at the post office (postmark) is determined as the submission date. If the Masters thesis is not submitted by the deadline, it is deemed and assessed as "unsatisfactory (5.0)".
- (2) According to § 11, two examiners must assess the Masters thesis. One of the examiners can be an assistant assessor if the thesis advisor represents the Computer Science Faculty according to § 17 sec. 3. The student's presentation and the scientific disputation are included in the assessment. The grade is calculated as the arithmetic average of the two examiners' assessments if they do not differ by less than 1.0. Otherwise, the examination committee decides the final grade after listening to each examiner. For this purpose, the committee can call in a third examiner.
- (3) The grade awarded the Master thesis is also the grade for final module.
- (4) The grade for the Masters thesis must be reported to the candidate within six weeks.

## **§ 19**

### **Passing the Masters examination**

- (1) The candidate has passed the Masters examination if all module examinations as well as the exams in general studies "Studium Generale" and, where applicable, exams in the optional elective area according to § 16 section 4 have been assessed with a grade of at least "sufficient (4.0)".
- (2) The overall grade is calculated as the weighted average of the grades from the seven module examinations in the main subject (§ 16, section 4, no.1 and 3) and, in the case of a minor elective subject, the grades from these elective courses, respectively module examinations. For the purpose of calculation the overall grade for the candidate, the credit points specified in § 16, section 4 should be modified as follows: the project group is weighted with 8 points, the final module examination with 50 points, and the elective minor subject with 12 points. The grades for general studies "Studium Generale" are not calculated into the final grade.
- (3) The overall assessment "passed with distinction" is awarded if the grade of the Masters thesis is 1.0, the overall grade calculated according to section 2 is at least 1.3, and none of the module grades in the main subject is below "good (2.0)".
- (4) The candidate has ultimately failed the Masters examination if he or she fails a module and compensation at the module level according to § 8 section 3 is no longer possible, or if the Masters thesis has been assessed for the second time with the grade "unsatisfactory (5.0)".
- (5) If the candidate has failed or is deemed to have failed the Masters examination, the chair of the examination committee must notify the candidate in writing and provide information about whether and, where applicable, to what extent and within which deadlines the Masters examination can be repeated.
- (6) The notification about the failed Masters examination or the forfeiture of the entitlement to an examination must be accompanied by instructions on the right to appeal.



- (7) If the candidate has failed the Masters examination, he or she, upon submitting an application with relevant supporting documentation and the university withdrawal form, can be issued a written certificate. The written certificate states the examination performances achieved and their grades, the outstanding examination performances necessary for a pass in Masters examination, and states that the Masters examination has not been passed. The same applies if the entitlement to an examination has been forfeited.

## **§ 20**

### **Repetition of the Masters examination**

- (1) The repetition of a Masters examination is achieved by repeating the module examinations or partial performances and examinations within the modules that a candidate has failed or is deemed to have failed.
- (2) If the Masters thesis has been assessed as "unsatisfactory (5.0)", it can be repeated once. A second repeat is not permitted. Returning a Masters thesis topic within the deadline specified in § 17, section 7, sentence 3 is only permitted if the candidate did not use this option while writing his or her first Masters thesis.
- (3) The candidate may suggest a different examiner for the repeat of the Masters thesis.

## **§ 21**

### **Extra Achievement**

- (1) Beyond the achievements required in § 16, students can take examinations in subjects or respectively modules of up to 16 credit points. The successfully completed exams are then listed in the "Transcript of Records".
- (2) It is possible to transfer credit points (in compliance with the maximum number allowed in sentence 1) toward compensation as mentioned in § 8 section 3. These maximum credit points also include examinations that were failed.
- (3) Examinations that have been passed in general studies "Studium Generale" cannot as a rule be used as compensation. One exception is an examination in the elective (minor) area of study.

## **§ 22**

### **Certificate**

- (1) If a candidate has passed the Masters examination, he or she receives a certificate. The certificate contains the grades obtained in the module examinations; the topic, the grade, and the Masters thesis supervisor's name; and the overall grade. The overall grade includes credit points also a grade in accordance with the ECTS rating scale is added. The titles of the classes selected and the names of the respective examiners are listed in the form of a "Transcript of Records" in the certificate appendix. Upon application, this supplement also includes additional performances with or without grades to an extent of up to 16 credit points.
- (2) The certificate must be signed by the chair of the examination committee. The date specified on the certificate is the day on which the last examination performance was passed.

**§ 23**  
**Masters certificate**

- (1) Together with the certificate, the candidate receives the Masters certificate that also bears the date of the certificate. It certifies the award of the Masters grade according to § 2.
- (2) The Masters certificate is signed by the dean of the faculty and the chair of the examination committee. The University's seal is affixed to the document.

**III. Final regulations**

**§ 24**  
**Invalidity in the Masters examination**

- (1) If the candidate cheated during an examination and this fact only becomes known after a certificate has been handed out, the examination committee may retroactively correct the grades where cheating took place and can declare the examination as fully or partially failed.
- (2) If the prerequisites for admission to an examination were not met, with no intention on the part of the candidate, and this fact becomes known after the certificate has been handed out, the passing of the examination compensates for this deficiency. If the candidate has gained admission by intentional deceit, the examination committee will decide over legal consequences, taking into account the Administrative Procedures Act (Verwaltungsverfahrensgesetz) of the state of North-Rhine Westphalia.
- (3) Before arriving at such a decision, the person in question must be given the opportunity to be heard.
- (4) The incorrect examination certificate must be surrendered and where applicable, a new one must be issued. A decision according to section 1 and 2, sentence 2 is not allowed after a period of five years after the issue date on the examination certificate.
- (5) If the examination is declared as an overall fail, the Masters degree must be revoked and the respective certificate must be surrendered.

**§ 25**  
**Revocation of the Masters degree**

A Masters degree is revoked if in hindsight proof is brought forth that it was achieved by cheating, or if significant prerequisites for the award were wrongly deemed to have been fulfilled. The Faculty Council decides over the revocation by a two-thirds majority of its members.

**§ 26**  
**Inspection of the examination files**

- (1) After each examination and conclusion of their examination procedures, a candidate can apply to have access to his or her written examination work, to the examiner's reports relating to it, and to the minutes of the examination.
- (2) This application must be made to the chair of the examination committee within one month after the result has been released or the examination certificate has been handed over to the candidate. The chair of the examination committee determines the place and time of inspection.

**§ 27**  
**Interim Provisions**

- (1) These examination regulations go into effect for all students registering for the Masters degree course for Computer Science for the first time at the University of Paderborn in the winter semester of 2010/11.
- (2) Students, who were registered at the University of Paderborn for the Masters Degree course in Computer Science before the winter semester 2010/11, can take their Master examination for the last time in the summer semester 2012 under the exam regulations which were applicable for them after the summer semester 2010. Repeat examinations can be taken, according to the examination regulations, within six months after the first examination. Tighter deadlines from older interim provisions are not affected.
- (3) According to these examination regulations the Masters Degree course of study in Computer Science can be changed upon application. This change is irrevocable.
- (4) Under justified circumstances the examination committee can decide on special interim provisions when applications arise.

**§28**  
**Date of effectiveness and publication**

- (1) These examination regulations come into effect as of \_\_\_\_\_. Simultaneously, the examination regulations for the Masters degree course in Computer Science dated \_\_\_\_\_ are repealed.
- (2) These examination regulations will be published in the Official Communications of the University of Paderborn (Amtlichen Mitteilungen der Universität Paderborn, AM Uni. Pb.).

These examination regulations are issued as a result of the decision of the Faculty Council of the Faculty for Electrical Engineering, Computer Science and Mathematics, dated the \_\_\_\_\_ and the legal review through the Rector's Office, dated the \_\_\_\_\_.

Paderborn, \_\_\_\_\_  
date

The Rector  
University of Paderborn  
Professor Dr. Nikolaus Risch