Studien- und Prüfungsordnung

Master of Science

Geodesy and Geoinformation Science

Please note that this is an unofficial translation of the Study and Examination Regulations.
In case of inconsistency between the German and the English version, the German version of the agreement prevails.

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Course Regulations

for the Masters degree programme in Geodesy and Geoinformation Science
at Faculty VI (Civil Engineering and Applied Earth Sciences)
of the Technical University of Berlin
leading to the degree of

Master of Science

(version of 15th December 2004)

In accordance with the law on higher education in the State of Berlin *(Berliner Hochschulgesetz - BerlHG)* (paragraph § 71 (1) no. 1, version of 13th February 2003 (published in the Berlin Law and Regulations Gazette *(Gesetz- und Verordnungsblatt für Berlin, GVBl.,* p. 82)), last modified by paragraph II of the law of 2nd December 2004 (published in *GVBl.* p. 484), the Council of Faculty VI (Civil Engineering and Applied Earth Sciences) approved the following course Regulations for the Masters programme in Geodesy and Geoinformation Science on 15th December 2004:

Table of contents

I. General provisions

§ 1 Scope

In conjunction with the examination Regulations of 15th December 2004, these Regulations govern the objective, content and schedule of the Masters degree course on Geodesy and Geoinformation Science at the Technical University of Berlin.

§ 2 Description of the course

The Masters degree programme in Geodesy and Geoinformation Science occupies four semesters. The first semester consists of basic modules providing a general scientific foundation. The subsequent semesters offer individual choices from among the specialised subjects of Geoinformation Technology, Space Geodesy and Navigation, Engineering Surveying and Estimation Theory as well as Computer Vision and Remote Sensing. Two specialised subjects must be selected from this list, thus allowing different fields to be studied in depth. The course also includes a language module and various other compulsory and optional modules. The Masters dissertation forms an essential part of the course of study and brings the programme to a close.

§ 3 Course objectives

(1) The objective of the Masters programme is to fit the successful students for independent scientific research work in the fields of geodesy and geoinformation science. The course includes participation in current research projects, especially in collaboration with Germany's National Research Centre for Geosciences *(Geoforschungszentrum Potsdam, GFZ)* and the German Aerospace Center) *(Deutsches Zentrum für Luft- und Raumfahrt, DLR).*

(2) The general objectives of the course include:

- the independent acquisition of knowledge and the processing of complex, technically and scientifically demanding projects in the field of geodesy and geoinformation science by means of research-related exercises and project work during the course;
- promotion of non subject-related and social competences such as communication and teamwork skills , critical thinking, commitment, sense of responsibility and managerial qualities by means of project work in small groups.

(3) The specific objectives of the course are to learn about:

- methods enabling relevant geographical information of high-quality (in terms of accuracy, reliability and currency) to be captured, analysed, linked, compressed and presented so as to meet the needs of society today (Geoinformation Technology);
- earth system and planetary research methods based on three-dimensional geodetic procedures, precise navigation and positioning methods, especially on the basis of global navigation satellite systems and inertial navigation systems (Space Geodesy and Navigation);
- geodetic instrumentation and methods of analysis of observational data and of object motion and deformation (Engineering Surveying and Estimation Theory);
- digital image processing, automatic image analysis and remote sensing methods (Computer Vision and Remote Sensing).

§ 4 Fields of future professional activity

The aim of this training is to produce Masters of Science in Geodesy and Geoinformation Science who are well qualified to carry forward the development, optimisation and practical implementation of the methods and procedures of the discipline and to take part in the further development of the science.

Graduates will carry out research work in a wide variety of fields at national and international research institutes and universities. In the higher management levels of government, they will be involved in the planning, design and regulation of our environment. In industry, they will participate in the development and exploitation of satellite navigation systems (for example in telematics), they will

design and implement geographical information systems (for example for regional development planning purposes and in the building and construction industry) and will be involved in the development of geodetic sensor systems. The scientific education of the graduates will qualify them to work in international teams and to succeed in the application of scientific methods in complex tasks.

Another field of activity exists in medium-sized service companies, for example in the acquisition, analysis and presentation of basic geographical data or as an advisory expert.

§ 5 Admission requirements

The admission requirements are stipulated in the admission Regulations.

§ 6 Start of the course

The course can only be started in the winter semester.

§ 7 Organisation and standard period of study

The standard period of the Masters degree course including the Masters dissertation is four semesters.

§ 8 Course supervision and counselling

(1) General and psychological counselling is offered by the competent office of the university administration.

(2) The members of the teaching staff, especially the study subject advisor, as well as the student study subject advisor responsible for the Masters degree course on Geodesy and Geoinformation Science, are ready to advise the students with regard to their subjects.

(3) The Faculty Council of Faculty VI (Civil Engineering and Applied Earth Sciences) elect a professor for a two years period as study subject advisor, who is responsible for the coordination and provision of course supervision and counselling.

(4) Course supervision and counselling tasks include appropriate support of students during their studies in accordance with their individual abilities and future professional intentions, within the framework of the options available in these Regulations and the courses offered. Course supervision therefore includes meetings for individual guidance on the course and examinations. In addition, Course supervision and counselling provides information on the courses offered at the faculty, on career prospects as well as on the organisation of the university. For this reason, Course supervision and counselling activities include the organisation and coordination of the creation of a study guide in accordance with (6) below as well as information meetings for students in accordance with (7) below.

(5) A mentoring programme promoting contact between students and university teachers and subject-related and organisational care of the students has been established at the Institute of Geodesy and Geoinformation Science. Students will be assigned a tutor. The associated guidelines are issued by the Faculty Council.

The aim is to provide students with support in planning their studies and to identify potential wrong decisions in good time. Participation is voluntary.

It is recommended to maintain the contact established in the first semester over the whole period of the course.

(6) The Institute of Geodesy and Geoinformation Science provides a study guide containing the following information:

- aim and structure of the course;
- introduction to the course;
- details of compulsory interdisciplinary options and other optional course components as well as recommendations for the free-choice options;
- fields of professional activity and recommendations for appropriate module combinations;
- availability of general advice and counselling; and
- advisory services within the Faculty.

(7) At the beginning of each course, the Institute of Geodesy and Geoinformation Science organises an introductory event to help students to settle in. These events provide the students with information on the course schedule as well as an overview of the options and requirements. Students

should get to know the teaching staff and will have the opportunity to make contacts within the student body.

§ 9 Types of academic activity

(1) The course objectives are met and the relevant module contents are provided by means of the following academic activities:

1. Lecture courses (VL)

In lecture courses, the subject is presented by the lecturer in the form of regularly delivered lectures and supported by appropriate material and the use of multimedia assistance, where possible.

2. Exercises (UE)

Exercises complete and consolidate the material delivered in lectures, using appropriate examples. At the same time, students should learn to apply the knowledge gained in lectures by working on typical tasks.

3. Seminar (SE)

Seminars are offered to promote the students' ability to work on selected subjects in an independent way but under the guidance of the university lecturer. They take the form of discussions, oral presentations (seminar papers) or written compositions.

4. Integrated course activities (IV)

In integrated activities, the types of activity previously mentioned are all incorporated without fixed time limits on each, so that theoretical acquisition of knowledge and its practical application take place within the same event.

5. Tutorial (TUT)

Tutorials are held to complete and consolidate knowledge delivered in lectures and practical courses as well as to prepare exercises in small groups. They are led by student assistants under the guidance of the responsible teacher.

6. Practical course (PR)

Practical courses are experimental exercises in which students can work on specific practical examples to exploit their theoretical knowledge acquired in other courses, and gain in knowledge through independent work.

7. Project (PJ)

Projects consist of interdisciplinary or subject-related planning and/or implementation processes which are carried out through cooperative work under the guidance of the examiner and are presented in the form of a seminar paper including subsequent scientific discussion.

8. Colloquia (CO)

Colloquia consist of a scientific discussion dealing with a specific problem. They supplement the course work through an exchange of experience with representatives from science and industry.

9. Excursions (field trips) (EX)

Excursions provide illustrative lessons outside the university. They are intended to supplement the theoretical knowledge gained on the course and they also offer an insight into future fields of activity.

10. Independent scientific work (WA)

Independent scientific work consists of drawing up studies, project and final theses, under the guidance of a member of the scientific staff.

11. Course block (KU)

A course block consists of related academic work occupying a period of one or two weeks, normally including of both scheduled lectures and free periods for practical work and specific tasks.

(2) All the different forms of instruction mentioned above must be accompanied by private study in order to gain the required qualification.

(3) At the first academic activity of a semester, the person responsible for the organisation of the individual course provides the students with an overview of its total content.

(4) If the module is to be completed with an examination or equivalent test, the requirements and the mode of assessment must be announced at the beginning of the relevant course(s).

(5) The value of the modules is indicated in course credits (LP) in accordance with the European Credit Transfer System (ECTS). One credit is equivalent to 30 hours of work.

§ 10 Proof of coursework grades

(1) In accordance with the relevant terms of the examination Regulations, proof of coursework grades may be a prerequisite for enrolment in module examinations.

(2) Coursework grades are earned by means of written work, exercises, seminar papers, recorded practical work or consultation in the context of the associated academic activities.

(3) The procedure and the conditions for the award of coursework grades are announced at the start of each activity by the staff member responsible. Within the framework of the present Regulations, the determination of criteria for the award of coursework grades lies with the person responsible for the organisation of the relevant activity.

(4) Academic activities can be repeated.

II. Structure, content and organisation of the course

§ 11 Value of course credits

(1) The Masters degree programme consists of modules leading to a total of at least 120 credits. The value of the modules offered from the first to the fourth semester is indicated in the course schedule in the appendix to these Regulations. This time schedule enables the studies to be structured in a reasonable way in order to finish them within the standard period.

(2) During the course, modules with a total value of 90 credits must be selected as follows:

a) foundation modules with a value of 30 credits;

b) modules selected from one of the four specialised subjects with a value of 21 credits. The project seminar for this specialised subject must be included, with a value of at least 6 credits .

c) modules with a value of 9 credits from another specialised subject;

d) a language module with a value of 4 credits;

e) modules with a value of 11 credits from the TU Berlin catalogue of interdisciplinary studies;

f) modules with a value of 15 credits from the whole range of courses offered by the Technical University of Berlin or by other universities, equivalent higher education institutions subject to the German Higher Education Framework Act or foreign higher education institutions and universities recognised to be equivalent.

(3) Students can apply for permission from the examination board for a combination of modules which differs from that in (2) above. The alternative combination must clearly focus on geodesy and geoinformation science, must provide the total number of credits defined in (2) and must include the minimum number of module examinations required in accordance with the examination Regulations.

§ 12 Masters dissertation

The amount of work required for the Masters dissertation is equivalent to 30 credits. Work for the dissertation is carried out during the final semester.

III. Concluding provisions

§ 13 Transitional provision

These Regulations are valid for the students registered for the Masters degree course on Geodesy and Geoinformation Science beginning from the winter semester 2005/2006.

§ 14 Effective date

These Regulations came into force the day after their publication in the Official Journal *(Amtliches Mitteilungsblatt)* of the Technical University of Berlin.

Changes of the course regulations of the masters program Geodesy and Geoinformation Science at the Faculty VI, Berlin University of Technology with the awarded academic degree Master of Science

From march the 21th, 2007 (not authorised version)

According to the § 71 Abs. 1 No. 1 of the Higher Education Act of the State of Berlin (BerlHG), as amended on Februar 13, 2003 (GVBl. S. 82), last amended by the Berlin Law of Medical School at the December 5, 2005 (GVBl. S. 739), the faculty council of the faculty VI of the Berlin University of Technology decided the following:

Article I

The course regulations for the masters program Geodesy and Geoinformation Science at the Faculty VI, Berlin University of Technology with the awarded academic degree Master of Science, as amended on December 15, 2004 (AMBl. TU S. 143), last amended on March 29, 2006 (AMBl. TU S. 156), will be changed as follows:

1. The title of the course will be changed in:

„Consecutive Master's Program Geodesy and Geoinformation Science"

2. § 2 will be replaced by:

"The Consecutive Master's Program Geodesy and Geoinformation Science comprises four semesters (sessions). During the first semester, basis modules will be offered which ensure the scientific education. The following semesters allows an individual profile from the thematic blocks Geoinformation Technology, Space Geodesy and Navigation, Engineering Surveying and Estimation Theory as well as Computervision and Remote Sensing. From these thematic blocks, a major block (main specialisation) has to be chosen. Additionally are compulsory optional modules of the professional studies and free optional modules. The final master thesis is an essential part of the program and forms the final of the studies. All lectures and examinations are held in English. Also the examination board is allowed to accept achievements which are adduced in German."

3. § 3 Abs. 2, second indent will be replaced by:

"Enhancement of multidisciplinary and soft skills like ability in communication and team work, critically thinking, willingness to perform and to take on responsibility as well as leadership characteristics by working in small groups."

4. § 5 will be replaced by:

“Requirements for admission to enrol in the Consecutive Master’s Program Geodesy and Geoinformation Science:

(1) Completition of a bachelors degree or equivalent of minimum six semesters in the field of surveying respectively geodesy or any other for the program relevant major.

(2) Applicants, whose mother tongues German, need to provide good English language skills which qualify for studies (equivalent the rank B1 of the European reference frame for languages). Applicants, whose mother tongue is not German, need to pass the TOEFEL-Test with a minimum score of 213 points (computer test) or an equivalent language test. Applicants, whose mother tongue is English, as well as applicants who hold an English university entrance qualification (A-level) or an English Bachelor degree, do not need to provide any language verifications

The verification in respect of content will be done by the examination board.”

5. § 10 Abs. 4 will be replaced by:

“A study achievement according to Abs. 1 is repeatable.”

6. § 11 Abs. 2, bullet b) will be replaced by:

„Modules of an amount of 21 CP from one of the four thematic blocks as major block (main specialisation). Within this major block, the project seminar with an amount of 6 CP has to be taken by the student.”

7. § 11 Abs. 2, bullet c) will be replaced by:

„Modules with an amount of 9 CP from each remaining thematic block.“

8. § 11 Abs. 2, bullet d) will be replaced by:

“Modules with an amount of 12 CP from the course catalogue of the Berlin University of Technology, other Universities, and equivalent universities according to the Higher Education Act (Hochschulrahmengesetz) as well as equivalent approved foreign Universities. Additionally, the choice of a language module as well as courses from the special catalogue of interdisciplinary courses (FÜS) is recommended. The combination of the modules has to be done by the Student and in an agreement with the personal Mentor (§ 8 Abs. 5).”

9. § 11 Abs. 2, bullet e) and f) drops out.

10. The attachment will be replaced by:

Allgemeiner Studienverlaufsplan

4. Sem.

Master Thesis
30 CP

2./3. Sem.

Professional studies und major block (main specialisation)
48 CP

Out of the following thematic blocks, a major block (main specialisation) has to be chosen (21 CP). Within this major block, the project seminar with an amount of 6 CP has to be taken. From each remaining thematic block, modules with an amount of 9 CP have to be taken.

A	B	C	D
Geo-information Technology	Space Geodesy and Navigation	Engineering Surveying and Estimation Theory	Computer Vision and Remote Sensing

Free optional modules
12 CP

Modules from the course catalogue of the Berlin University of Technology or other Universities. The choice of a language module as well as courses from the special catalogue of interdisciplinary courses (FÜS) is recommended.

Free optional modules according to requirements

1. Sem.

Basis Modules
30 CP

Modules of an amount of 30 CP have to be taken.

- Geoinformation technology module **(6 CP)**
- Statistical testing methods and adjustment calculation module **(6 CP)**
- Database systems module **(6 CP)**
- Geodetic reference systems module **(6 CP)**
- Geophysics I module - Geotech (geophysical reconnaissance using geotechnologies) **(6CP)**
- CV1 module (Photogrammetric Computer Vision) **(6 CP)**

Exemplary Study Schedule

30 CP Basis modules
21 CP From thematic block A (major block incl. project seminar)
9 CP From each thematic block B, C, D (professional studies)
12 CP Free optional modules
30 CP Master Thesis

CP	1. Semester	2. Semester	3. Semester	4. Semester
1 2 3 4 5 6	Basis module **1** 6 CP	**Thematic block A** GIS Analysis **Thematic block A** GIS Management	9 CP	
7 8 9 10 11 12	Basis module **2** 6 CP	6 CP **Thematic block A** GIS Project Course 6 CP **Thematic block C** IGA Adjustment Calculus II		
13 14 15 16 17 18	Basis module **3** 6 CP	9 CP **Thematic block B** SGN Physical Geodesy SGN Planetary Geodesy		**Master Thesis**
19 20 21 22 23 24	Basis module **4** 6 CP	9 CP **Thematic block D** CV4 - Hot Topics in Computer Vision	9 CP	
25 26 27 28 29 30	Basis module **5** 6 CP	**Free optional modules**	12 CP	30 CP

Article II

The previous changes will become effective with the publication in the official bulletin of the Berlin University of Technology. They are valid for the matriculation of the winter semester 2007/2008.

Examination Regulations

for the Masters Degree Programme in Geodesy and Geoinformation Science
at Faculty VI (Civil Engineering and Applied Earth Sciences)
of the Technical University of Berlin
leading to the degree of

Master of Science

(version of 15th December 2004)

In accordance with the law on higher education in the State of Berlin *(Berliner Hochschulgesetz - BerlHG)* (paragraph § 71 (1) no. 1, version of 13th February 2003 (published in the Berlin Law and Regulations Gazette *(Gesetz- und Verordnungsblatt für Berlin, GVBl.,* p. 82)), last modified by paragraph II of the law of 2nd December 2004 (published in *GVBl.* p. 484), the Council of Faculty VI (Civil Engineering and Applied Earth Sciences) approved the following examination regulations for the Masters programme in Geodesy and Geoinformation Science on 15th December 2004:

Table of contents

I. General

§ 1 Objective of the Masters degree

Following on from a Bachelors degree course, the Masters degree provides an additional qualification for a professional career.

§ 2 Academic degree

Students who have successfully passed their Masters examination are awarded the academic degree "Master of Science" by Faculty VI (Civil Engineering and Applied Earth Sciences) of the Technical University of Berlin.

§ 3 Structure of the programme, standard period of study

(1) The course of study is divided into the foundation section, two specialised subject sections, an interdisciplinary studies section, a language module, a freely selectable optional section and the Masters dissertation. All modules forming part of the Masters programme are completed with a module examination. Module examinations may take any of the forms defined in paragraphs §§ 6, 7 and 8.
(2) The standard period of study is four semesters, including the time required to produce the Masters dissertation. Vacation semesters in accordance with TU Berlin regulations on students' rights and duties are not taken into account. Students who are no longer registered as members of the university remain entitled in principle to take the examination, provided that the examination requirements related to the individual module have been met during the period of registration.
(3) Recommendations on the appropriate order and timing of individual modules are given in the Course Regulations.

§ 4 Examination Board

(1) The Council of Faculty VI (Civil Engineering and Applied Earth Sciences) appoints the members of the Examination Board for the Masters degree programme on Geodesy and Geoinformation Science. The board will consist of:
- three professors teaching within the Masters degree course on Geodesy and Geoinformation Science;
- one further member of the academic staff teaching within the Masters degree course on Geodesy and Geoinformation Science; and
- one student registered for the Masters degree programme in Geodesy and Geoinformation Science.

The members of the Examination Board and their deputies are appointed by the members of the relevant status group within the Faculty Council.
(2) The Examination Board elects the chairperson from among the professors already appointed to the Board. The remaining professors will become deputies.
(3) The period of office is two years. The Faculty Council may, with a majority of its members, appoint a new Examination Board prior to the end of the period of office of the existing board.
(4) The Examination Board is responsible for all matters related to these Regulations, especially for:
- the organisation of examinations;
- the accreditation of study periods and coursework and examination grades;
- the production of lists of examiners; and for
- decisions on appropriate examination conditions for students with persistent or permanent physical handicaps which partly or totally prevent them from achieving coursework grades or from passing an examination in the required form.

Except for fundamental issues, the Examination Board can decide by resolution to delegate its responsibilities to the chairperson. Affected persons may appeal against decisions taken on the basis of this delegation of responsibility. The Board must then decide on such an appeal. Members of the Examination Board may not take part in such decisions if they are themselves involved in the matter in question.

(5) The Examination Board regularly reports to the Faculty Council about its activities, and provides ideas for reform of the Course and Examination Regulations.
(6) Members of the Examination Board have the right to attend the examinations and to satisfy themselves fully that the Examination Regulations are being observed.
(7) Decisions taken by the Examination Board are communicated by the chairperson to the competent office of the Central University Administration, subject to data protection rules as far as necessary for its work or where the rights of third parties are affected. The competent office of the Central University Administration then informs those affected of such decisions.
(8) The members of the Examination Board and their deputies are subject to official secrecy. If they are not public servants, they must be bound to confidentiality by the chairperson.
(9) The Examination Board meets at least once per semester. The meetings of the Board are convened by the chairperson either if required or at the request of a member.
(10) Prior to decisions by the Examination Board on individual cases, persons affected must be given the opportunity to make a statement.
(11) Decisions taken by the Examination Board can be contested by taking legal action in the Berlin Administrative Court *(Verwaltungsgericht Berlin)*.

§ 5 Forms of examination, registration for module examinations, selection of the examiner

(1) Academic achievements for the Masters degree are proven by the following forms of examination: oral module examination (§ 6), written module examination (§ 7) and coursework grades equivalent to examinations (§ 8). A Masters dissertation (§ 20) must also be produced in the course of the Masters programme. The number and form of the required Masters examinations are defined in § 19.
(2) Before registering for the first examination, entry to the Masters examination must be requested in accordance with § 18.
(3) Applications for oral module examinations must be made prior to the examination date at the competent office of the Central University Administration. The examinations must be taken within three months after the application. With the consent of the Examination Board, the examiner and the candidate may agree exceptions to this.
(4) Participation in the written module examination constitutes registration for it. The examination date is decided by the examiner and will be announced by means of a notice in good time, and at least four weeks prior to the specified date.
(5) A module examination delivered in the form of coursework grades equivalent to an examination begins, at the earliest, on the day after the registration at the competent office of the Central University Administration. Applications must be lodged in good time before the first examination. The application closing date is fixed by the examiner taking into account (2) above, and will be announced at the beginning of the course(s) to which the module examination relates. Applications should be made in the third week of lectures at the earliest.
(6) Applications to retake examinations must be submitted to the competent office of the Central University Administration.
(7) At the request of the examiner, in specific individual cases for which reasons must be given, the Examination Board may decide on a different form of examination. In such cases, the candidates must be informed immediately, or at latest four weeks prior to the date of the examination.
(8) If a candidate credibly asserts, by medical certificate if necessary, that he or she is unable to take an examination in whole or in part in the required form due to persistent or permanent physical handicaps, the Examination Board must allow the candidate to deliver equivalent achievements in a different form. The same applies to course work.
(9) If several persons are entitled to carry out examinations for a module which is subject to an oral module examination, the candidate has the right to choose his examiner from among these persons. With good reason, especially excessive workload of the chosen examiner due to accumulation of examinations, the Examination Board, on valid request of the examiner and subject to agreement with the candidate, may call another examiner.

§ 6 Oral module examination

(1) In oral module examinations, the candidate should demonstrate his or her detailed knowledge of the subject and an ability to deal with specific questions. Oral module examinations are carried out by an examiner in the presence of an observer.
(2) During an oral module examination, a reasonable volume of tasks to be handled in written form may also be set, provided that the oral character of the module examination is not thereby lost.
(3) The content, progress and result of the module examination must be recorded in an examination report, which must be signed by both the examiner and the observer and then be entered in the examination file. On completion of the oral module examination, the result must be announced to the candidate.
(4) With good reason, the module examination may be interrupted by the examiner. A new examination date should be fixed so as to enable the module examination to take place immediately after cessation of the reason for the interruption. Any existing results of the examination must be counted. In this case, it is not necessary to apply again for the module examinations. The reasons for the interruption of a module examination must be notified to the Examination Board.
(5) Oral examinations are open to attendance by other members of the university, unless the candidate objects. However, the examiner can restrict the number of listeners, and the public character within the institution does not extend to the discussion and announcement of the examination result.
(6) Oral module examinations can be carried out either in groups or as individual examinations. At the request of the candidate, an individual examination must be carried out.
(7) The duration of the examination is a minimum of 20 minutes and a maximum of 45 minutes per candidate. These limits may be exceeded with the consent of the candidate.

§ 7 Written module examination

(1) In written module examinations, students must prove that they have achieved the course objectives by demonstrating their ability to understand typical problems and find ways of solving them, in a limited time and with limited aids.
(2) The written module examination will be marked by the appointed examiners. Written module examinations will normally be marked by two different examiners. The final grade is based on the arithmetic mean of the two individual marks. The duration of a written module examination must not exceed four hours.
(3) The examiner decides on any aids to be permitted during a written module examination. A list of permitted aids will be announced at the same time as the examination date. The results will be published promptly, not later than four weeks after the date of the written module examination, and written work will be made available for inspection for a limited period. For this purpose, the questions with model answers will also be available.
(4) After the announcement of the examination results, candidates whose grade for a written module examination is "fail" (5.0) will be given the opportunity to be re-examined orally. This oral examination will then be marked as "pass" or "fail". In case of a " pass", the grade for the written module examination will be fixed as "sufficient" (4.0).

§ 8 Coursework equivalent to an examination

(1) In coursework treated as equivalent to examinations (PS), students should be able to gain grades continuously and in a variety of ways. In addition, coursework should enable the form of examination to be well adapted to the teaching and subject matter.
(2) Coursework treated as equivalent to an examination is produced in the form of written compositions, oral presentations (seminar papers), recorded practical work or consultation in the context of one or more courses.
(3) The type, weighting and value of coursework grades are defined by the examiner for each examination module and will be announced to the candidates at the beginning of the relevant courses.
(4) Individual coursework results will be published at the latest seven days after their production.

§ 9 Persons entitled to examine, observers

(1) In accordance with § 32 of the law on higher education for the State of Berlin *(Berliner Hochschulgesetz, BerlHG)*, professors and qualified university lecturers are entitled to serve as examiners. In addition, the Faculty Council may appoint other academic staff as well as part-time lecturers and persons experienced in professional practice and training as examiners.
(2) The Examination Board appoints examiners by assigning them to an individual examination module. Only persons teaching the discipline to which the examination relates can be appointed as examiners, unless compelling reasons demand an exception.
(3) Only persons who have completed higher education and are competent in the field to which the examination relates, can be appointed as observers by the Examination Board. Observers have no power to make decisions. Their task is solely to ensure that the examinations run in accordance with the regulations.
(4) Examiners and observers are subject to official secrecy. If they are not public servants, they must be bound to confidentiality with regard to their examination activity by the chairperson of the Examination Board.

§ 10 Accreditation of study periods, coursework and examinations

(1) Study periods and coursework and examination grades of equivalent content and value are accredited in accordance with paragraph § 6 of the TU Berlin regulations on the rights and duties of students *(Ordnung der Technischen Universität Berlin über Rechte und Pflichten der Studentinnen und Studenten, OTU).* Criteria of equivalence between different courses and examinations are defined by the Examination Board.
(2) If it is impossible to establish the equivalence in accordance with § 6 OTU of other coursework and examination grades achieved elsewhere, the Examination Board will decide whether a supplementary examination must be taken. Equivalence agreements approved by the Standing Conference of the German State Ministers of Education and Cultural Affairs and the Committee on Higher Education as well as arrangements related to university and college partnerships must be taken into account. If no such agreement exists, the Examination Board will take a decision. In case of doubt with regard to equivalence, guidance may also be sought from the Central Office for Foreign Education.
(3) Supplementary examinations serve only to establish whether the student has the required minimum knowledge. If the result of the supplementary examination is assessed as "insufficient", it will be considered as "fail". In this case, a regular module examination must be taken in accordance with these regulations.
(4) Applications for supplementary examinations must also be made in accordance with § 5 (2) and (6).
(5) Grades awarded on the basis of recognised coursework and examinations will be accredited for grade determination purposes (insofar as grading systems are comparable) and taken into account when calculating the overall grade in accordance with the Examination Regulations for the Masters Degree Programme in Geodesy and Geoinformation Science. Where grading systems are not comparable, the "pass" grade will be awarded.

§ 11 Additional modules

(1) Apart from the module examinations stipulated by the present Examination Regulations relating to these Masters studies, students may take examinations in other examination modules (additional modules) offered at the Technical University of Berlin or other universities and equivalent higher education institutions subject to the regulations of the German framework law on higher education as well as at recognised equivalent foreign higher education institutions and universities.
(2) At the request of the student, the results of such examinations will be recorded in the certificate. However, they will not be taken into account for the calculation of the overall grade in accordance with § 12. Any additional module examinations must be registered, at the latest, before the last compulsory examination is taken.

§ 12 Marking of examinations, overall grade and overall result

(1) Each individual examination will be marked by the relevant examiner by awarding a grade and the corresponding result in accordance with the following scheme.

Grade	Result
1.0; 1.3	Very good
1.7; 2.0; 2.3	Good
2.7; 3.0; 3.3	Satisfactory
3.7; 4.0	Sufficient
5.0	Fail

(2) Examination marks must be reported to the competent office of the Central University Administration.
(3) Any objections by candidates to the marking of an examination are governed by the rules covering appeal procedures.
(4) If an oral or written module examination is taken in the course of a module, the corresponding grade will become to the module grade. For module examinations held in the form of coursework equivalent to an examination, the grade for the module is calculated from the weighted arithmetic mean of the individual grades. Any module grade calculated in this way will be assigned the corresponding result in accordance with the table in § 12 (6) below.
(5) Any examination result below the minimum grade of "sufficient" (4.0) is considered as failed; the examination may be retaken in accordance with § 13 below. In this case, the student will receive a written notification from the competent office of the Central University Administration, including detailed information on the time limit for a retake as well as advice on possible legal remedies.
(6) The overall grade of the Masters examination will be calculated from the arithmetic mean of the grades of the individual modules, weighted in accordance with the number of credits available, together with the Masters dissertation. The overall grade will be assigned an overall result in accordance with the following table:

Grade	Result
1.0 – 1.5	very good
1.6 – 2.5	good
2.6 – 3.5	satisfactory
3.6 – 4.0	sufficient
4.1 – 5.0	fail

In the Masters examination, the overall result "excellent" or "with distinction" can be awarded if the overall grade is 1.2 or better.
(7) Only the first decimal place (after the point) is taken into account for the calculation of module grades and the overall grade. Any subsequent places of decimals are truncated without rounding.
(8) A relative grade from the European Credit Transfer System (ECTS) grading scale will also be given for the overall grade. The ECTS assessment scale classifies students using statistical criteria. Successful students (only) will be awarded the following ECTS grades, thus providing information on the relative position of the graduate which will be included in the Diploma Supplement. The reference group should have a minimum size and must be defined by the Faculty.

A – excellent	the best 10%
B – very good	the next 25%
C – good	the next 30%
D – satisfactory	the next 25%
E – sufficient	the last 10%

§ 13 Retaking of module examinations

(1) Failed module examinations within the Masters examination can generally be retaken only once. Exceptionally, where the candidate can provide strong justification, the Examination Board may permit a second retake of a module examination.
(2) Module examinations which have been successfully passed may not be retaken. Unsuccessful examination attempts at other higher education institutions or in other degree programmes of the Technical University of Berlin must be taken into account.
(3) Examinations to be retaken must be passed at the latest within twelve months after the date of the original examination.
(4) In case of change of degree course or higher education institution, the Examination Board defines the applicable time limit for retaking examinations and decides on any failure to meet this deadline in accordance with § 14 below.

§ 14 Withdrawal, absence, cheating, infringement of the regulations

(1) Any withdrawal from an examination for which a student is registered must be notified in writing to the examiner as well as to the competent office of the Central University Administration on the third working day prior to the date of examination at the latest.
(2) Any withdrawal after the time limit defined in (1) above or absence from the examination for a valid reason must be notified in writing to the Examination Board via the competent office of the Central University Administration within five days after the examination date. This period may be extended by the Examination Board if notification of the valid reason within the time limit was demonstrably impossible.
(3) Any illness of the candidate, or of a person for whose care the candidate alone is primarily responsible, and proven by medical certificate, must be taken into consideration. The Examination Board decides whether to accept other reasons. If the reasons given are accepted, a new examination date will be fixed in consultation with the candidate. Any existing examination results must be taken into account. If the reasons are not accepted or if no valid reason is given, the examination is considered as "failed" and may be retaken in accordance with § 13 above.
(4) Candidates trying to influence the result of an examination by cheating or disturbing the regular course of an examination may be excluded from the remainder of the examination by the examiner. In this case, the examination is regarded as "failed" and may be retaken in accordance with § 13 above. Candidates who have been excluded from the examination may request the Examination Board to review the decision immediately. The decision of the Examination Board must be immediately notified to the candidate in writing, with reasons. Any acts covered by the first sentence this sub-paragraph but which only emerged after the conclusion of the examination, will be subject to § 16 (1) below.

§ 15 Documentation of results, certificates, Masters diploma

(1) Following successful completion of the Masters examination, the competent office of the Central University Administration will issue a certificate promptly after receipt of the result of the last examination. This certificate includes:
- the name of the degree programme;
- the examination modules with the individual module grades, results and relevant numbers of credits;
- the names of the persons responsible for each module; and
- the subject, grade, result and number of credits for the Masters dissertation.

In addition, the certificate includes the overall result in accordance with § 12 (5) above.
(2) The certificate bears the date of the last examination and will be signed by the Dean of Faculty VI (Civil Engineering and Applied Earth Sciences) as well as the chairperson of the Geodesy and Geoinformation Science Examination Board. In addition, it bears the official seal of the Technical University of Berlin.
(3) Any relevant examinations passed outside the Technical University of Berlin will also be noted on the certificate.

(4) In addition to the certificate for the Masters degree course , the competent office of the Central University Administration will issue a Masters diploma with the same date, certifying the award of the academic degree of Master of Science. This diploma will be signed by the President of the Technical University of Berlin and the Dean of Faculty VI (Civil Engineering and Applied Earth Sciences) and provided with the seal of the Technical University of Berlin.
(5) In addition to the certificate and the diploma, a Diploma Supplement will be issued in English, providing details of the content and form of the qualification associated with the academic degree awarded.
(6) The award of the diploma entitles the recipient to bear the academic degree of Master of Science.
(7) The certificates and the diploma include the information that the examination grades were achieved in accordance with the provisions of these Regulations.
(8) Documentation concerning examinations successfully passed will be issued by the competent office of the Central University Administration. In contrast, documentation concerning successfully completed coursework will be issued by the person responsible for the relevant course.
(9) Students who have definitively failed to pass the Masters examination may request the competent office of the Central University Administration to supply written confirmation that the Masters examination has been failed, including details of the examinations taken and their grades and of any examinations required to achieve the Masters degree which have not been taken.
(10) If coursework grades and examinations equivalent to more than half of the Masters examinations are recognised but these have already formed part of another course of studies completed with an academic degree, a Masters examination certificate in accordance with (1) above will not be issued, neither will an academic degree in accordance with (5) above be awarded. In this case, the candidate will receive written confirmation in accordance with (7) above, indicating that he or she has fulfilled the requirements of the present examination regulations thanks to the additional academic achievements associated with previous studies.

§ 16 Invalidity of module examinations

(1) If a candidate is found to have cheated during an examination or if the regulations are found to have been infringed, as defined in § 14, but this fact emerges only after the issue of the certificate, the Examination Board in consultation with the Faculty Council may accordingly rectify the relevant grades retrospectively, and declare the examination fully or partly "failed". See also the statutes on the appeal procedure.
(2) If the requirements for entry to the Masters examination have not been met, but without any intended deception on the part of the candidate, and this fact emerges only after the issue of the certificate, this fault will be remedied by confirming the result of the examination.
If the candidate has wrongly gained entry to the Masters examination by deliberate deception, the Examination Board will decide whether or not to withdraw the entry.
(3) The incorrect certificate must be withdrawn and a new one must be issued if applicable. Any decision in accordance with (1) or (2) above must be taken within a period of five years.
(4) The rules defined in (1) to (4) above are valid for documentation in accordance with § 12 (4), (5), (6), (7) and § 15 (5).
(5) Provisions on the revocation of an academic degree remain unaffected.

§ 17 Data processing authorisation and inspection of the examination file

(1) The acquisition and deletion of data are governed by the students' data regulations of the State of Berlin.
(2) For a period of one year after passing a module examination, at their request and in reasonable time, candidates are granted access to their written examination work, the related assessments of the examiners and the examination reports. For the rest, the law on administrative procedures for the State of Berlin is to be applied.

II. Masters examination

§ 18 Entry requirements and procedures

(1) Students must apply to the competent office of the Central University Administration to enter the Masters examination before taking the first module examination. The application must include the following documents, if they have not yet been submitted to the office:
- the student's proof of registration;
- a declaration by the student that he or she is familiar with these Examination Regulations as well as the Course Regulations;
- a declaration by the student whether or not he or she has already failed or definitively failed a Masters examination in the Geodesy and Geoinformation Science degree programme or in a related degree course offered at a scientific institution of higher education subject to the German framework law on higher education, and whether he or she is involved in a pending examination procedure; and
- confirmations of accreditation in accordance with § 10 above, if applicable.

Students who, through no fault of their own, cannot provide the required documents in the prescribed form, should supply the relevant proofs in another suitable way. The Examination Board will decide whether or not to accept them.
(2) The Examination Board decides on applications for entry to the Masters examination. Entry may only be refused if:
- the documents specified in (1) are incomplete;
- the student has definitively failed the Masters examination in the Geodesy and Geoinformation Science degree programme or in a related degree course offered at a scientific institution of higher education subject to the German framework law on higher education; or
- the student is currently involved in an examination procedure in the Geodesy and Geoinformation Science degree programme or in a similar degree course offered at a scientific institution of higher education subject to the German framework law on higher education; or
- the entitlement to enter the examination has lapsed.

(3) When registering for a module examination, the required proofs of coursework grades in accordance with the relevant module description must be provided.
(4) The Masters dissertation may only be registered if all modules including the 3rd semester have been completed successfully in accordance with the course schedule.

§ 19 Objective, extent and form of the Masters examination

(1) The objective of the Masters examination is to establish whether the candidate is ready to practise professional activities, having regard to the changes affecting the professional world, and has the relevant expertise, abilities and knowledge of methods to enable him or her to carry out in-depth technical and scientific work, to think critically on the interactions between technology and society and to act responsibly in the further development of research results with regard to their scientific and especially their social impact.
(2) The Masters examination consists of the module examinations cited in the Appendix to these Examination Regulations or a combination of module examinations already approved by the Examination Board under paragraph § 11 (3) the Course Regulations, together with the Masters dissertation.
(3) Registration for an examination in an optional module leads to its inclusion in the Masters examination for that student.
(4) The Faculty Council may add new modules to the existing list of course options.
(5) The Faculty Council may add new academic activities to existing modules, as long as the overall extent and the qualification objective of the module remain unchanged.
(6) At the request of the Examination Board, the Faculty Council may change the form of examination for individual modules.

§ 20 Masters dissertation

(1) The Masters dissertation is an examination work and, at the same time, forms part of the candidate's scientific education. Through this work, candidates are expected to demonstrate their ability to deal independently with a problem related to the Masters degree programme in Geodesy and Geoinformation Science, using scientific methods and within a specified time limit.
(2) The candidate should submit the application for the Masters dissertation, with the recommendation of an advisor who is a member of the academic staff, together with details of the proposed subject as applicable, to the competent office of the Central University Administration, from where the application will be forwarded to the suggested academic advisor via the Examination Board, once the fulfilment of the required conditions has been verified. Paragraph § 9 (2) above applies accordingly.
(3) The academic advisor must be involved in the educational programme within the Masters degree course on Geodesy and Geoinformation Science and be entitled to carry out examinations. This also applies to Masters dissertations produced in another Faculty or at an institution outside the Technical University of Berlin.
(4) The task of the Masters dissertation is subdivided depending on the nature and the volume of the expected results. When assigning the Masters dissertation project, the academic advisor pays attention to the equivalence of subject matter and takes care to ensure that the candidate can be expected to complete the dissertation independently, using scientific methods, within the period specified in (5) below.
(5) The amount of work required for the Masters dissertation is equivalent to 30 credits. The Masters dissertation must be submitted, at the latest, 6 months after the assignment of the subject. On request, and after hearing the academic advisor, the Examination Board may extend the submission deadline.
(6) The assigned subject of the Masters dissertation project is forwarded by the academic advisor to the competent office of the Central University Administration and issued to the candidate, once the start date and submission deadline for the dissertation have been fixed.
(7) The subject assigned for the Masters dissertation may be rejected once by a candidate, but only within the first two months of the period assigned to the work. If a second attempt is made to produce a Master's dissertation, the subject may only be rejected, if this right has not yet been taken up during the first attempt.
(8) The academic advisor is regularly informed about the progress of the dissertation project by consultation with the candidate and written interim reports supplied by the latter, if necessary.
(9) The Masters dissertation must be accompanied by a declaration by the candidate that it is entirely his or her own work. In addition, the sources of any material used must be indicated. Any borrowed components from other works must be identified.
(10) The Masters dissertation must take the form of a written report in English or German. It must also include a summary in German if it is produced in English, and vice versa.
(11) A Masters dissertation may be produced by several students working together (Masters group dissertation). This must be approved by the Examination Board who must also define objective criteria to enable the results of the individual candidates to be assessed separately. Dissertation groups must be advised by two persons entitled to carry out examinations, including at least one professor or qualified university lecturer. Before grades and results for group dissertations are fixed, consultations must take place between the academic advisors and the candidates, together with up to two other persons entitled to carry out examinations.
(12) After its completion, two copies of the Masters dissertation must be submitted to the competent office of the Central University Administration, where the date of submission will be registered and the thesis will be forwarded for examination and marking. Masters dissertations submitted outside the time limit will be assessed with the grade and result of 5.0 and "fail" respectively. If there are valid reasons for late submission, paragraph § 14 (2) above applies.
(13) The Masters dissertation must be examined and marked in accordance with § 12 (1) above by the academic advisor and by one other person entitled to carry out examinations. If the results from the two examiners are different, the arithmetic mean will of the marks will be calculated and the grade and result will be assigned in accordance with § 12 (3). Where the two results are different and one of them is "fail", the Examination Board will appoint a third person entitled to carry out examinations. If the result of this

third assessment is also "fail", the dissertation is considered to have failed. Otherwise, the result will be calculated using the arithmetic mean of the marks for the two “passes”.
(14) The grade will be disclosed promptly after submission of the Masters dissertation.
(15) In case of unsatisfactory results, the Masters dissertation may be repeated only once.

III. Concluding provisions

§ 21 Transitional provisions

These Examination Regulations are valid for the students registered for the Masters degree programme in Geodesy and Geoinformation Science beginning from the winter semester 2006/2007.

§ 22 Effective date

(1) These examination regulations came into force the day after their publication in the Official Journal *(Amtliches Mitteilungsblatt)* of the Technical University of Berlin.
(2) The provisions of paragraph § 12 (8) will only be applied when relevant data is available.