

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
- § 2 Description of the course
- § 3 Course objectives
- § 4 Fields of future professional activity
- § 5 Admission requirements
- § 6 Start of the course
- § 7 Organisation and standard period of study
- § 8 Course supervision and counselling
- § 9 Types of academic activity
- § 10 Proof of coursework grades

II. Structure, content and organisation of the course

- § 11 Value of course credits
- § 12 Masters dissertation

III. Concluding provisions

- § 13 Transitional provision
- § 14 Effective date

VI. Appendix

- Overall course schedule (curriculum)
- Sample schedule

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) Completion 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:

4. Sem.	Master Thesis 30 CP														
2./3. Sem.	<p style="text-align: center;">Professional studies und major block (main specialisation) 48 CP</p> <p style="text-align: center;"><i>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.</i></p> <table style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="width: 25%;">A</td> <td style="width: 25%;">B</td> <td style="width: 25%;">C</td> <td style="width: 25%;">D</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">Geo-information Technology</td> <td style="border: 1px solid black; padding: 5px;">Space Geodesy and Navigation</td> <td style="border: 1px solid black; padding: 5px;">Engineering Surveying and Estimation Theory</td> <td style="border: 1px solid black; padding: 5px;">Computer Vision and Remote Sensing</td> </tr> </table>		A	B	C	D	Geo-information Technology	Space Geodesy and Navigation	Engineering Surveying and Estimation Theory	Computer Vision and Remote Sensing	<p style="text-align: center;">Free optional modules 12 CP</p> <p style="text-align: center;"><i>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.</i></p> <div style="border: 1px solid black; background-color: #cccccc; padding: 5px; text-align: center;">Free optional modules according to requirements</div>				
A	B	C	D												
Geo-information Technology	Space Geodesy and Navigation	Engineering Surveying and Estimation Theory	Computer Vision and Remote Sensing												
1. Sem.	<p>Basis Modules 30 CP</p> <p><i>Modules of an amount of 30 CP have to be taken.</i></p> <table style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"> <td style="padding: 5px;">Geoinformation technology module (6 CP)</td> </tr> <tr> <td style="padding: 5px;"> </td> </tr> <tr style="background-color: #cccccc;"> <td style="padding: 5px;">Statistical testing methods and adjustment calculation module (6 CP)</td> </tr> <tr> <td style="padding: 5px;"> </td> </tr> <tr style="background-color: #cccccc;"> <td style="padding: 5px;">Database systems module (6 CP)</td> </tr> <tr> <td style="padding: 5px;"> </td> </tr> <tr style="background-color: #cccccc;"> <td style="padding: 5px;">Geodetic reference systems module (6 CP)</td> </tr> <tr> <td style="padding: 5px;"> </td> </tr> <tr style="background-color: #cccccc;"> <td style="padding: 5px;">Geophysics I module - Geotech (geophysical reconnaissance using geotechnologies) (6CP)</td> </tr> <tr> <td style="padding: 5px;"> </td> </tr> <tr style="background-color: #cccccc;"> <td style="padding: 5px;">CV1 module (Photogrammetric Computer Vision) (6 CP)</td> </tr> </table>				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)
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	Basis module 1	Thematic block A GIS Analysis		Master Thesis		
2						
3						
4						
5					Thematic block A	9 CP
6					6 CP	GIS Management
7	Basis module 2	Thematic block A GIS Project Course				
8					6 CP	
9						
10						
11					6 CP	
12					6 CP	Thematic block C IGA Adjustment Calculus II
13	Basis module 3	IGA Adjustment Calculus II				
14						
15					9 CP	
16					Thematic block B	
17					SGN Physical Geodesy	
18					6 CP	SGN Planetary Geodesy
19	Basis module 4	Thematic block D CV4 - Hot Topics in Computer Vision				
20					9 CP	
21						
22						
23					9 CP	
24					6 CP	
25	Basis module 5	Free optional modules				
26						
27						
28						
29					12 CP	
30					6 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.