
Examination and Study Regulations
for the
international
Master's (M. Sc.)
Degree Program
Mathematics for Data and Resource Sciences

This is a translation of the regulations and is not legally binding. For legal purposes please refer to the original German document.

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Examination Regulations for the Master's Degree Program in Mathematics for Data and Resource Sciences at the Technische Universität Bergakademie Freiberg

As per § 13 sub-paragraph 4 clause 2, in conjunction with § 35 sub-paragraph 1 clause 2 and § 34 of the Higher Education Act of the Free State of Saxony (SächsHSFG) of January 15th 2013 (SächsGVBl. p. 3) (most recently changed by Act from Juni 1st, 2022, SächsGVBl. p. 381) the Faculty Council of the Faculty of Mathematics and Computer Science at the Technische Universität Bergakademie Freiberg, in consultation with the Senate, agreed on the following regulations for the Master's degree program in Mathematics for Data and Resource Sciences:

Comment on language usage: references to persons refer to both genders.

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§ 1

Purpose of the Master's Examination

The Master's examination should ascertain whether,

- candidates have deepened and broadened the specialist knowledge gained within the framework of their first university degree;
- they possess the ability to independently develop solutions to complex problems and topics with scientific methods and to further develop them, as well as to critically question the facts;
- they are able to identify new problems and scientific developments and incorporate them accordingly into their work and
- beyond that, as a result of interdisciplinary and social skills, they are able to organize and lead complex projects.

§ 2

Terms and Definitions

(1) Modules as defined by these regulations are composite subject areas rounded off thematically and in time to form self-contained units that can be examined and for which credit points can be awarded. Modules can consist of various teaching and learning methods, such as lectures, tutorials, practicals (laboratories, field work, internships etc.), assignments and private study. A module usually takes one semester. In exceptional circumstances, it can be extended to two or three semesters. Modules are completed by module examinations. For successfully completed modules, credit points (CP) are awarded. Modules are distinguished as follows:

1. Obligatory modules (Pflichtmodule, PM) are compulsory for students.
2. Elective modules (Wahlpflichtmodule, WPM) are modules covering a certain breadth that are chosen from among alternatives determined in the Examinations Schedule (Appendix).
3. Specialization modules (Schwerpunktmodule, SPM) are elective modules that belong to a specialization and define the student's study specialization of their studies.
4. Optional modules (Freie Wahlmodule, FWM) are modules covering a certain breadth that are chosen from all modules offered at the TU Bergakademie Freiberg or at a cooperating Institute of Higher Education.

(2) A credit point is the unit of measurement for the student's expected workload. A credit point corresponds to a workload of 30 hours of study. In addition to attendance, workload includes private study. The overall workload of a full-time student in one academic year is assumed to be 1800 hours. This does not require a student to carry out a certain workload in order to be able to pass certain examinations.

(3) Module examinations are examinations that complete modules.

(4) Examinations (§ 7) describe the individual specific examination events. Examinations are assessed and usually graded (§ 11).

(5) Coursework are rendered in conjunction with courses. They are rendered in the form of seminar papers, research papers, reports, written or oral tests or have other forms. They are assessed but not necessarily graded.

(6) Prerequisites consist of coursework that are a precondition for taking a module examination. A module examination can only be taken if the prerequisites are satisfied. Prerequisites are assessed with regard to the fulfillment of requirements but are not necessarily graded. They do not influence the module grade. There is no limit to the number of times they can be repeated.

§ 3

Prescribed Period of Study and Extent

(1) The prescribed period of study is 4 semesters. The prescribed period of study relates to the time in which the course can be completed. This includes time for study and examinations including the Master's thesis and the colloquium (thesis defense) (§19).

(2) The total workload of the module examinations and of the Master's thesis including the colloquium (thesis defense) necessary for graduating on the Master's program equates to 120 credit points (CP).

(3) Credit points can be gained in obligatory modules and elective modules that are scheduled in the course plan. Modules from Bachelor courses can be taken as elective modules or optional modules, as long as they do not come to more than 20 % of the total of the Master's degree program in Mathematics for Data and Resource Sciences and students are able to verify that they did not take the module in question during their Bachelor studies. Even in the case of non-identical modules, the content of Bachelor modules taken as part of the Master's studies may not overlap substantially with previously taken Bachelor modules. The possibility to take additional modules (§ 20) is unaffected.

(4) The completion of a professional internship of at least four months' length is expressly desired. In the case that a professional internship of at least four months' length was completed during the course of study, the Master's thesis with professional internship of the module Master's Thesis (Mathematics for Data and Resource Sciences) can be chosen upon submission of an internship report. The scope of the research project of the Master's thesis with professional internship is reduced accordingly.

§ 4

Examination Structure

(1) The Master's examination consists of module examinations and the Master's thesis and colloquium (§ 19 sub-paragraph 10).

(2) Module examinations are made up of one or more examination in a module. Module examinations are taken throughout studies.

§ 5

Deadlines

(1) The Master's examination should be taken during the prescribed period of study, although it can be taken at the latest within four semesters of the prescribed period of study ending. The details are regulated in § 13 sub-paragraph 3.

(2) Module examinations should be taken in the semester in which the courses of the module finish, as scheduled in the study schedule. As long as proof of the necessary admission requirements (§ 6) is produced, module examinations can also be taken beforehand.

(3) The candidate is duly informed about the arrangement of the prerequisites and examinations to be rendered and about the dates on which they should be rendered as well as informed of their results. The dates for written examinations are announced by the Student Services Office. The results are available in the self-service portal.

(4) Deadlines for issuing of the topic of the Master's thesis as well as its submission are regulated in § 19 sub-paragraphs 3 and 6.

(5) It is assumed that students acquire an average of 30 credit points in each semester. Students that by the start of the third semester have not passed any module examinations should take part in a consultation at the Departmental Student Advisory Service in the third semester.

(6) Deadlines do not start during the periods of maternity leave in accordance with § 3 of the Maternity Protection Act and these periods extend ongoing deadlines. In the case of parental leave (in accordance with the "Bundeselterngeld- und Elternzeitgesetz"), § 12 enrollment regulations of the TU Bergakademie Freiberg applies. Expectant mothers, parents of minors, disabled students and chronically ill students can make an application to the Examination Board for deadline extensions as far as the student does not have a leave of absence for the same reason. For this a doctor's certificate can be requested.

§ 6

General Admission Requirements

(1) A module examination can only be taken by someone who

1. is registered at the TU Bergakademie Freiberg,
2. has rendered the prerequisites and fulfilled the special admission requirements for the module in question and
3. has not definitively failed the module examination in question.

Decisions on exceptions are made by the Examination Board.

The possibility of taking an examination in an external procedure in accordance with the regulations is unaffected by this.

(2) The issuing of the topic of the Master's thesis (§ 19 sub-paragraph 3) requires the candidate to be registered on the Master's degree program in Mathematics for Data and Resource Sciences at the TU Bergakademie Freiberg and, in accordance with § 4 of the study regulations for this degree program, to have fulfilled, where necessary, requirements of the Examination Board.

(3) Admission for an examination is applied for by the student in the Student Services Office. Application deadlines are duly announced. The Student Services Office verifies the existence of the admission requirements and compiles admission lists. The admission is announced by the Student Services Office through the Self-Service IT-Portal. Students are obligated to check the registration in the Self-Service IT-Portal.

(4) If candidates cannot produce evidence for rendered prerequisites in accordance with the valid study regulations for an ongoing course they are participating in, they will be admitted subject to the presentation of evidence before the examination takes place. If the evidence is in the form of physical documentation, it must be submitted at least two working days before the examination to the Student Services Office or directly before the examination to the examiner if it is online information from the Student Services Office for the examiners.

(5) Admission to an examination is denied if

1. candidates do not fulfill the requirements set out in sub-paragraph 1 or the procedural regulations of sub-paragraphs 3 and 4,
2. the documentation is incomplete and the candidate is to blame for this,
3. candidates definitively failed a Master's examination in the same or, in accordance with federal state law, in a related degree program or are in a pending examination procedure for the examination in question or
4. candidates, in accordance with federal state law, have lost their examination entitlement due to exceeding deadlines for the registration for or taking of the examination.

(6) Along with the application for admission to the first examination, candidates must enclose a declaration

1. that they are familiar with these examination regulations and
2. of whether the requirements of sub-paragraph 5 N. 3 and 4 have been met.

§ 7

Types of Examinations

(1) Examinations are

1. oral examinations (§ 8),
2. written examinations (§ 9) and
3. alternative assessments (§ 10).

All types of examinations can be carried out as digital examinations, if the method of the examination is appropriate for digital formats and if equal treatment of the candidates is ensured. The TU Bergakademie Freiberg can use external help for carrying out digital examinations.

(2) If candidates can show credibly that they are, owing to long-lasting or permanent disability or illness or as a result of pregnancy or because they are the parent of a minor, unable to take examinations, partially or in their entirety or in the prescribed form or period, then they are requested in writing to take the examinations within an extended period or to take equivalent examinations in another form. This usually requires submission of a doctor's certificate. This applies accordingly to coursework, prerequisites and the Master's thesis including the colloquium.

(3) In general, English is the language used for coursework, prerequisites and examinations.

§ 8

Oral Examinations

- (1) In the oral examination, candidates should prove that they have a contextual understanding of the subject area and are capable of putting specialized problems into context. Furthermore, it should be ascertained whether or not candidates have a fundamental knowledge appropriate to the level of the degree program.
- (2) Oral examinations are taken in the presence of at least two examiners (examination by panel) or one examiner in the presence of an expert observer (§ 17) as a group examination or as an individual examination.
- (3) The duration of the examination is stated in the module description and is, for one individual examination, at least 20 minutes and at most 60 minutes.
- (4) As part of the oral examination, written tasks of reasonable length can be set, as long as the oral character of the examination is preserved.
- (5) The examiner decides which materials and aids students are able to use during the oral examination. A list of applicable materials and aids allowed is duly published.
- (6) The essential items of the oral examination are recorded in a report, which is signed by the examiner and the observer. The candidate is informed of the result and grade at the end of the oral examination. The report is to be retained for a duration of five years.
- (7) Students wishing to take the same module examination at a later date can, if space allows, be present as a listener, as long as the candidate does not make an objection to an examiner. The listener must leave before the candidate is consulted and notified of the examination result. Any listener attempting to influence or interrupt the examination will be excluded from the examination.

§ 9

Written Examinations

- (1) In written examinations, candidates should prove that they can, using the fundamental knowledge necessary, solve problems and deal with issues using the current methods of their field in a limited amount of time and with limited aids. The candidate can be given a choice of topics.
- (2) § 8 sub-paragraph 5 applies accordingly.
- (3) Written examinations, the passing of which is a requirement for continuing on the program, are generally assessed by two examiners. The grade is calculated from the mean average of the individual evaluations. The period of evaluation should not last longer than four weeks.
- (4) The duration of an examination is set in the module description and may not be less than 60 minutes or more than 240 minutes.
- (5) The candidate will be informed of the result and grade of the examination.

§ 10

Alternative Assessments

- (1) Alternative assessments are generally carried out in seminars, laboratories and projects. The assessments can be written compositions (papers, laboratory reports etc.), oral presentations (with written composition or handouts) or write-ups of practical work relating to work carried out in one or several courses or in another form. The assessments must be individually attributable.
- (2) For predominantly written assessments, § 9 sub-paragraph 3 applies accordingly, with the proviso that the examiner is the person responsible for the course underlying the alternative assessment. For predominantly oral assessments, § 8 sub-paragraph 2 applies accordingly.
- (3) On submission of an assessment as relating to sub-paragraph 1, the candidates must ensure, in writing, that their work – in the case of group work, their labelled section of the work – was carried out independently, using only the stated sources and materials specified.
- (4) The type and size of an alternative examination is set in the module description.
- (5) The candidate will be informed of the result and grade of the assessment.

§ 11

Evaluation of Examinations, Formation and Weighting of Grades

- (1) The grades for the individual examinations are determined by the respective examiner.
- (2) The following system of grades is used for the evaluation of examinations:

1 = very good (sehr gut)	= outstanding performance
2 = good (gut)	= considerably above average Performance
3 = satisfactory (befriedigend)	= average performance
4 = sufficient (ausreichend)	= poor yet acceptable performance
5 = not sufficient (nicht ausreichend)	= unacceptable performance with considerable faults
- (3) In order to differentiate between examination performances, individual grades can be increased or decreased by 0.3 points to an intermediate value; the grades 0.7, 4.3, 4.7 and 5.3 are excluded. Individual grades can be separately weighted to make up the overall grade.
- (4) If a module examination consists of more than one examination, then the module grade is the weighted arithmetic mean of the individual examinations. Only the first decimal place is considered; grades are never rounded up. The respective weighting of examinations is set in the Examination Schedule.

The degree classes are as follows:

- | | |
|---|------------------|
| - for an average of up to and incl. 1.5 | = very good |
| - for an average from 1.6 up to and incl. 2.5 | = good |
| - for an average from 2.6 up to and incl. 3.5 | = satisfactory |
| - for an average from 3.6 up to and incl. 4.0 | = sufficient |
| - for an average of 4.1 and above | = not sufficient |

(5) For the Master's examination, an overall grade is formed. This consists of the arithmetic mean of the module grades, weighted by credit points, and the overall grade of the Master's thesis including the colloquium in accordance with § 19 sub-paragraph 11. The Master's thesis including the colloquium is, for this calculation, weighted with 30 credit points. Sub-paragraph 4 clauses 2 and 4 apply accordingly.

(6) Apart from the grade based on the German scale of 1 – 5, in addition to the overall grade an ECTS ranking is given according to the following EU-standardized ECTS evaluation scale:

ECTS grades of successful participants

A	for the best	10 %
B	for the next	25 %
C	for the next	30 %
D	for the next	25 %
E	for the next	10 %
F	(failed)	

The calculation of the ECTS grade for a particular year is based on results of at least two and not more than four previous years' graduates, although not on those of that year's graduates (cut-off date October 1st). If within these four years, fewer than 30 students graduate from this degree program, as well as for graduates of the first two years of this program, the ECTS grades are determined as follows:

ECTS grades

A	1.0 up to and including 1.5 (excellent)
B	1.6 up to and including 2.0 (very good)
C	2.1 up to and including 3.0 (good)
D	3.1 up to and including 3.5 (satisfactory)
E	3.6 up to and including 4.0 (sufficient)
F	from 4.1 (failed)

§ 12

Retraction of Application, Default, Withdrawal, Deceit, Breach of Regulations

(1) An examination counts as "not sufficient" (5.0) if candidates miss an examination date binding to them without valid reason or if they withdraw from an examination. The same applies if a written examination is not completed within the time designated.

(2) Candidates can retract their application for an examination without giving any reasons, as long as they inform the Student Services Office at least one week in advance. The candidates have to check the correct retraction of their application in the self-service portal.

(3) An examination date is binding for the purposes of sub-paragraph 1 if the deadline for the retraction (sub-paragraph 2) of the application for an examination has passed.

(4) The reason given for defaulting or withdrawing from an examination must be immediately communicated in writing to the Student Services Office and shown to be credible. In the case of illness or maternity leave, presentation of a doctor's certificate is required and in cases of doubt, an official medical report. As far as keeping the deadline for the first application for examination, the repetition of examinations, the reasons for defaulting the examination and the timely completion of examinations is concerned,

the illness of a minor that is predominantly cared for by the candidate alone is equivalent to the candidate themselves being ill. If the reason is accepted, a new date will be set. The examination results already existing should in this case be offset.

(5) If candidates attempt to influence the result of their examinations by deceit or through the use of unauthorized aids, the examination in question will be graded "failed". Candidates breaching regulations concerning procedure of an examination can be excluded from the examination by the respective examiner or head invigilator; in such cases the examination is graded "failed". In severe cases, the Examination Board can exclude the candidate from further examinations.

§ 13

Passed and Failed

(1) Module examination is considered passed when the module is graded at least "sufficient" (4.0). A module examination counts as definitely failed if a module examination is not graded at least "sufficient" (4.0) and a repetition is no longer possible.

(2) If a module examination consists of a number of examinations, passing the module examination can be made dependent on specific examinations being graded at least "sufficient" (4.0). This is set in the examination schedule (Appendix).

(3) The Master's examination is passed when the respective module examinations are passed and the Master's thesis as well as the colloquium (§ 19 sub-paragraph 10) have been graded "sufficient" (4.0). A module examination that has not been taken within four semesters after the end of the regular period of study counts as failed. A module examination failed at the first attempt can be repeated within a year of completion of the first attempt. It counts as failed upon expiry of that period of time. A second repeat examination can only be taken at the next possible examination date. Further details are regulated in § 14.

(4) If a module examination, the Master's thesis or the colloquium are graded worse than "sufficient" (4.0), the candidate is informed if and, where applicable, to what extent and by what deadline the module examination, the Master's thesis or the colloquium can be repeated.

(5) If candidates have not passed the Master's examination, they can request a summary of achievement. This states which examinations have been rendered, their grades and, if applicable, the examinations still missing. It states that the Master's examination has not been passed and whether candidates are entitled to take further examinations.

§ 14

Repeating Module Examinations

(1) Failed module examinations can only be repeated once within a period of one year after the first examination attempt of the last examination. Examinations can only be repeated if they are graded worse than "sufficient" (4.0).

(2) A second repeated examination can only be taken at the next possible examination date. Applications have to be submitted at the Student Services Office. Another repetition examination is not permitted.

(3) The repetition of a passed module examination is not permitted.

§ 15

Recognition and Accreditation of Periods of Study, Coursework, Examinations and Examination Attempts

- (1) Coursework and examinations, including failed examination attempts, which have been achieved in degree programmes at a university in the Federal Republic of Germany or foreign university, are recognized with application unless there are substantial differences with respect to the acquired competencies. For the recognition, the equivalence agreements, the equivalence protocols for existing agreements concerning joint degree awards, passed by the Conference of the Ministers for Education and Cultural Affairs and the German Rectors' Conference (HRK), agreements ratified by the Federal Republic of Germany as well as agreements within the framework of university cooperations should be followed. The Master's thesis is excluded from recognition, except in the case of double degree programmes.
- (2) Applications for recognition of coursework and examinations, according to sub-paragraph 1, achieved before the enrolment in this degree programme can only be submitted until the next exam registration period after enrolment. Applications for recognition of coursework and examinations, according to sub-paragraph 1, achieved after the enrolment in this degree programme can only be submitted if no examinations have been taken, which are to be accredited.
- (3) Qualifications acquired outside the Higher Education System, particularly relevant professional activities, can be accredited on application if they are deemed to be equivalent. The qualifications are equivalent if their content, scope and requirements essentially correspond to those of this degree program. This comparison is not schematic but rather an overall consideration and evaluation.
- (4) If coursework and examinations are recognized or qualification outside the Higher Education System are acquired, the period of study is also accredited. The grades, where grading systems are comparable, are transferred and incorporated into the calculation of the overall grade. For non-compatible grading systems, the entry "passed" may be used. A remark of the recognition on the certificate is permissible. The relevant number of credit points, in accordance with these regulations, is given. Periods of study, coursework and examinations of up to 30 credit points can be are recognized.
- (5) With resumption of studies in the same degree programme after a deferral, the student is enrolled in the continuing semester and the achieved coursework and examinations of the degree programme are recognized.
- (6) Failed module examinations, the passing of which is necessary for the degree programme, are recognized without application.
- (7) Applications for recognition or accreditation are reviewed by the Examination Board. With the application the students have to submit the required documents. After all documents have been submitted, the recognition and accreditation decision shall not exceed 2 months. Certified translations can be required for all documents presented in a language other than German. The documents required are usually descriptions of modules including learning outcomes, types of teaching, contents, workload and pre-requisites as well as the formation and weighting of grades of the modules.

§ 16

Examination Board

(1) For the organization of the examinations and the administration of the duties assigned in these regulations, an Examination Board is appointed by the Faculty Council of the Faculty of Mathematics and Computer Science. The Examination Board, with the cooperation of the Student Services Office, makes decisions on all matters concerning examinations, in particular on

1. exceptions to the admission to examination (§ 6),
2. relaxation of examination conditions (§ 7 sub-paragraph 2) and deadline extensions (§ 5 sub-paragraph 6),
3. the consequences of breaches of regulations (§ 12 sub-paragraph 5),
4. the issuing of notification of passing and failing (§ 13),
5. the recognition and accreditation of periods of study, coursework and examination credits (§15),
6. the appointing and announcing of examiners (§ 17),
7. the issuing of the Master's thesis (§ 19 sub-paragraph 3) including the approval to work externally (§ 19 sub-paragraph 2),
8. deadline extensions for submitting the Master's Thesis (§ 19 sub-paragraph 6),
9. the enlisting of a third examiner to evaluate the Master's Thesis (§ 19 sub-paragraph 9),
10. the invalidity of the Master's examination (§ 23) and
11. appeals against its decisions (§ 25).

The Examination Board also makes decisions on

1. the imposition of conditions for the admission to the Master's degree program as well as exceptions of the admission requirements within the Study Regulations for the Master's Degree Program and
2. the appointing of members of the commission for determining eligibility in accordance with appendix 2 of the Study Regulations for the Master's degree program in Mathematics for Data and Resource Sciences.

Any decisions of the Examination Board which are detrimental to the students have to be communicated to the student in writing and reasons for the decisions have to be given with instruction on right to appeal.

The Examination Board is also to be included in the consultations of the Commission of Studies concerning the updating of the program in accordance with the study regulations of the Master's degree program in Mathematics for Data and Resource Sciences.

(2) The Examination Board has five members and consists of three professors, one research associate as well as one student. The term of office of the members is three years and one year for the student member. Repeat appointments are allowed.

(3) The chairperson, his/her deputy, the other members of the Examination Board and their deputies are appointed by the Faculty Council of the Faculty of Mathematics and

Computer Science The appointment of the student takes place in consultation with the student representatives of the Faculty of Mathematics and Computer Science.

(4) The Examination Board is quorate when a meeting has been duly called and when a majority of members are present. A meeting has been duly called when all members are informed of the date a week in advance. If, in urgent cases, this period of notice cannot be kept, the reasons for the shortened notice are to be written in the minutes. The Examination Board makes rulings on the basis of majority voting of the voting members present. Written consent in lieu of a meeting is allowed.

(5) The Examination Board makes sure that the rules of the examination regulations are kept. The Examination Board proposes reforms of the study regulations/study schedules and examination regulations.

(6) The chairperson leads the business of the Examination Board. The Examination Board can assign to the chairperson duties to be carried out.

(7) The members of the Examination Board have the right to be involved in examinations. They cannot exercise responsibilities of the Examination Board if they themselves are participants in matters concerning an examination.

(8) The meetings of the Examination Board are not open to the public. The members of the Examination Board and their deputies are subject to official secrecy. If they are not civil servants they are bound to secrecy through the chairperson.

§ 17

Examiner and Observer

(1) The Examination Board appoints the examiners and informs the Student Services Office of this. Examiners appointed should only be members and associates of the Technische Universität Bergakademie Freiberg or of another institute of higher education who are authorized to teach independently in the relevant field of the examination. An examiner that is authorized to teach independently only in a partial area of the examination subject can also be appointed as long as this is appropriate to the object of the examination. In exceptional cases, teachers for specific tasks as well as people experienced in both professional and educational contexts can be appointed examiners, as long as the character of the examination is appropriate. An observer or examiner can only be appointed if they themselves have at least the qualification that the examination in question leads to or an equivalent qualification.

(2) The examiners and observers are independent in their examination activity.

(3) The candidate can, in specially justified cases, nominate the examiner or examiners for the evaluation of oral examinations (§ 8). The nomination does not constitute entitlement. The candidate will be duly informed of the names of the examiners. For the evaluation of the Master's thesis, § 19 sub-paragraph 7 applies.

(4) For the examiners and observers, § 16 sub-paragraph 8 clauses 2 and 3 apply accordingly.

§ 18

Components and Object of the Master's Examination

(1) The components of the Master's examination are the module examinations named in the appendix to these regulations and the Master's thesis including the colloquium. The object of examinations and prerequisites assessments is the subject matter of the modules named in the appendix of these regulations. Details of this are given in the module descriptions. The number and type of the particular examinations and prerequisites assessments are regulated in the Appendix to these regulations.

(2) As soon as the students have attempted the module examination for the first time, an elective module (Wahlpflichtmodule, WPM) is considered as chosen, in principle. The choice can be cancelled within the prescribed period of study by written statement by the student to Student Services Office. Outside of the prescribed period of study, the chronological sequence of the first complete module examinations attempt counts as a binding choice. The change of elective modules outside of the prescribed period of study requires the approval of the Examination Board. If more elective modules are taken than required for the volume of Credit Points, the chronological sequence (first complete module examinations attempt) is the determining factor for counting as an elective module, unless a written statement according to clauses 2 or the approval of the Examination Board according to clauses 4 is existent. Credit Points of modules above the required volume of Credit Points count as additional modules.

§ 19

Registration, Topic Issue, Submission, Evaluation and Resubmission of the Master's Thesis and Colloquium

(1) Through the Master's thesis and colloquium, candidates should show that they are able, within a prescribed period, to independently process a defined complex problem from their field with appropriate scientific methods and to present both the problem and their own work in writing and orally.

(2) The Master's thesis can only be supervised by a professor or by another person authorized for examinations by federal state law, as long as they are employed at the TU Bergakademie Freiberg in an area relevant for the degree program. If the Master's Thesis is to be undertaken in an institution other than the TU Bergakademie Freiberg then the approval of the chairperson of the Examination Board is required.

(3) The topic of the Master's thesis must relate to the content of the degree program and be defined such that deadlines for its completion can be met. The topic is issued, after registration in the Student Services Office, by the supervisor via the Examination Board. The topic and date are to be put on record. Candidates can express their wishes with regards to the topic and nominate a supervisor. Upon the candidate's request, the chairperson of the Examination Board will punctually issue the topic of the Master's Thesis. The topic of the Master's thesis can only be issued if modules totalling at least 50 credit points (except Master's thesis (Mathematics for Data and Resource Sciences)) of the Master's programme Mathematics for Data and Resource Sciences have been rendered. Registration for the Master's thesis should take place at the latest one month after completion of the last module examination required by these examination regulations.

(4) The topic can only be returned once and this within four weeks of its issue. For resubmission of the Master's thesis, the returning of the topic by the mentioned

deadline is only admissible if the candidate did not make use of this possibility for preparing the first thesis.

(5) The Master's thesis can also be rendered in the form of a group thesis if the examined contribution of the individual candidate is clearly distinguishable and assessable on the basis of sections, page numbers or other objective criteria that enable an unambiguous differentiation and if it meets the requirements of sub-paragraph 1.

(6) Two bound copies of the Master's thesis must be submitted to the Student Services Office of the TU Bergakademie Freiberg 9 months after the date on record of the issue of the topic at the latest. Two bound copies of the Master's thesis with professional internship must be submitted to the Student Office of TU Bergakademie Freiberg no later than six months after the date of issue of the topic. In either case, a further copy has to be submitted in a machine-readable PDF file format. In individual cases, a substantiated request for an extension of up to three months can be made. The submission date is to be put on record. On submitting candidates must make a written oath that they carried out their work – in the case of group work, their marked section of the work – independently and only with the use of the sources and aids stated.

(7) The Master's thesis is generally evaluated and graded in the form of a written report by at least two independent examiners. One of them should be the issuer of the topic (supervisor). The evaluation procedure should not exceed four weeks.

(8) For procedures based on international agreements of joint degree awards with partner universities, an examiner with equal rights will be appointed from the partner university.

(9) The Master's thesis is passed when both examiners grade it at least "sufficient" (4.0). § 11 sub-paragraphs 2 and 3 apply accordingly. In the case of differing evaluations, the grade is calculated from the arithmetic mean. The Examination Board can, in exceptional cases, enlist a third examiner. A third examiner is enlisted when the difference between the two evaluations equates to more than 1.7. Sub-paragraph 3 applies accordingly. In the case of only one of the examiners giving the grade "not sufficient" (5.0) and the other giving the thesis a grade of 3.3, 3.7 or 4.0, a third examiner is brought in and decides whether the Master's thesis is graded "sufficient" (4.0) or "not sufficient" (5.0). A Master's thesis submitted after the deadline will be graded "not sufficient" (5.0).

(10) The Master's thesis is defended in a Colloquium. At the Colloquium, the issuer of the topic of the Master's thesis (supervisor) must participate. The requirement for admission to this colloquium is the Master's thesis being graded at least "sufficient" (4.0). The candidate has the right to inspect the evaluation report one day before the colloquium at the latest. The colloquium should take place within four weeks of submission of the Master's thesis. The colloquium presentation should last 30 minutes and the subsequent discussion should not exceed 60 minutes. The colloquium is evaluated as an oral examination (§ 8).

(11) The grade of the Master's thesis including the colloquium is calculated from the grade of the Master's thesis as per sub-paragraph 9 with a weighting of 2 and from the grade of the colloquium with a weighting of 1, whereby the colloquium must be graded at least "sufficient" (4.0). § 11 sub-paragraph 4 applies accordingly.

(12) For the resubmission of the Master's thesis and the colloquium, § 14 applies accordingly. § 14 sub-paragraph 2 applies with the proviso that for a second repetition of the Master's thesis can be submitted within a month of receipt of the ruling of failure.

(13) In total, 30 credit points are awarded for the successful completion of the Master's thesis and colloquium.

§ 20 Additional Modules

The candidate can take an examination in modules (additional modules) other than those planned in the examination schedule (Appendix). These modules can be voluntarily rendered from the entire range of modules on offer at the TU Bergakademie Freiberg or from a cooperating institute of higher education. They are not considered in the calculation of a student's workload. They do not count towards the calculation of the overall grade of the Master's examination, but can, upon request, be recorded in the transcript.

§ 21 Academic Degree

If the Master's examination is passed, the TU Bergakademie Freiberg awards the academic degree

"Master of Science" (abbreviated "M. Sc.").

§ 22 Transcript, Master's Degree Certificate and Diploma Supplement

(1) After successful completion of the Master's examination, the candidate generally receives a transcript within 4 weeks after having defended the Master's thesis (in a colloquium) or after the announcement of the result of the last examination. Included in the transcript are the module grades, the credit points, the topic and grade of the Master's Thesis, the overall grade as well as the method of calculation of the ECTS grade. If applicable – upon the candidate's request – the result of module examinations in modules other than those prescribed (additional modules) can be included in the transcript.

(2) The date on the Master's transcript is that of the rendering of the last examination and is the date of the official copy.

(3) The TU Bergakademie Freiberg issues a Diploma Supplement (DS) in English in accordance with the "Diploma Supplement Model" of the European Union/Council of Europe/UNESCO.

(4) In addition to the transcript of the Master's examination, the candidate receives a Master's degree certificate with the date of the transcript as per sub-paragraph 2. Therein is certification of the conferral of the Master's degree.

(5) The Master's degree certificate and the transcript are signed by the Dean of the Faculty of ... and by the chairperson of the Examination Board and furnished with the seal of the TU Bergakademie Freiberg. An English translation of the Master's degree certificate and, upon the candidate's request, of the transcript is appended.

§ 23

Invalidity of the Master's Examination

(1) If the candidate has cheated during an examination and this fact is only discovered after the handing over of the transcript, the grade of the examination is amended as per § 12 sub-paragraph 5 clause 1. In this case, the module examination is declared "not sufficient" (5.0) and the Master's examination "failed". This applies accordingly to the Master's thesis and colloquium.

(2) If the requirements for the approval of a module examination were not met, without willful deceit on the part of the candidate, and if this fact is discovered after the handing over of the transcript, then this flaw was erased by the passing of the module examination. If the candidate deliberately unjustly obtained admission to the module examination, then the module examination is declared "not sufficient" (5.0) and the Master's examination "failed".

(3) The candidate should be heard before the decision.

(4) The incorrect transcript is confiscated by the Student Services Office and, if applicable, a new one is issued. Along with the incorrect transcript, the Master's degree certificate, the Diploma Supplement and the English translations of the certificate and transcript are also to be confiscated if the Master's examination has been declared "failed" on the basis of deceit.

(5) A decision as per sub-paragraphs 1 and 2 clause 2 is excluded after a period of five years from the date of the official copy of the transcript.

§ 24

Inspection of Examinations Files

Within one year after completion of the examination procedure the candidates, upon request, are allowed, within a reasonable time period, to inspect their written theses, the evaluation thereof and their examination reports.

§ 25

Appeals Procedures

(1) Appeals against decisions that were made in accordance with these regulations must be presented to the ~~Examination Board~~ TU Bergakademie Freiberg in writing or by recorded declaration within a month of the student being informed of the decision. The Student Services Office takes the appeals.

(2) The reasons for the appeals ruling must be given with instruction on right to appeal and sent to the appealing party. The appeal ruling also determines who pays the costs of the procedure.

Appendix: Examination Schedule

Module	Type of Exams and Prerequisites	Weighting within the Module	Special Requirements for Admission	CP
Obligatory modules				
Basics in Partial Differential Equations	MP	1		4
German A 1/ 1st Semester	KA PVL (Aktive Teilnahme an mindestens 80% des Unterrichts)	1 0		4
Geomodelling – Geostatistics for Natural Resource Modelling	KA* AP* (Set of assignments)	2 1		5
Mathematics of Machine Learning	MP	1		6
Seminar Mathematics for Data and Resource Sciences	MP* (Scientific Talk) AP* (Seminararbeit)	1 1		6
Master Thesis (Mathematics for Data and Resource Sciences)	AP* (Thesis without Internship) MP* (Defense) OR AP* (Thesis with Internship) MP* (Defense) AP* (Written report and evaluation discussion)	2 1 OR 2 1 0	Modules totalling 50 credit points (expect Master Thesis (Mathematics for Data and Resource Sciences))	30
Elective Modules**				
Modules totalling 65 credit points have to be chosen from the following catalogues of elective modules. Whereas modules totalling 49 credit points have to be chosen from the catalogue mathematic elective modules and modules totalling 4 credit points have to be chosen from the catalogue minor subject elective modules.				
A. Mathematic elective modules				
A. Mathematic elective modules: Analysis				
Inverse Problems	MP	1		5
Differential Geometry	MP	1		5
Selected Topics in Applied Operator Theory	MP	1		5

This is a translation of the regulations and is not legally binding.
For legal purposes please refer to the original German document.

Module	Type of Exams and Prerequisites	Weighting within the Module	Special Requirements for Admission	CP
Mathematics of Crystallographic Texture Analysis	MP	1		5
Selected Topics in Partial Differential Equations	MP	1		5
Wavelets	MP	1		6
Global Analysis	MP	1		5
Fourier Analysis	MP	1		5
Mathematical Image Processing	MP	1		6
A. Mathematic elective modules: Discrete Mathematics/ Algebra				
Algorithmic Graph Theory	KA* MP*	1 1		9
Topological Data Analysis	MP	1		6
Algorithmics	AP (Seminarvortrag) KA	3 1		6
Methods of Applied Algebra	MP	1		6
Algorithmic Geometry	MP	1		6
Geometry and Topology	MP	1		6
A. Mathematic elective modules: Numerics/ Optimisation				
Current Topics in Numerical Analysis I	MP	1		6
Scientific Computing Project	AP (Presentation of the algorithm and implementation) PVL (Notes of the presentation as PDF or in paper)	1 0		6
Modeling and Simulation	MP	1	Numerical Analysis for Mathematics	9
Introduction to High Performance Computing and Optimization	MP/KA (MP = individual examination; KA if 30 students or more) PVL (Programming Project)	1 0		4
Current Topics in Numerical Analysis II	MP	1		6

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Module	Type of Exams and Prerequisites	Weighting within the Module	Special Requirements for Admission	CP
Vector Optimization	MP	1		6
Parallel Computing	MP	1		6
Finite Element Methods (FEM) for Mathematicians	MP	1		9
Numerical Methods for Nonlinear Optimization and Nonlinear Systems	MP	1		9
Stochastic Programming	MP	1		6
A. Mathematic elective modules: Stochastics				
Multivariate Statistical Analysis and Time Series	MP	1		9
Statistical Shape Analysis	KA	1		5
Stochastic Geometry and Spatial Statistics	MP	1		9
Methods in Machine Learning	MP	1	Mathematics of Machine Learning	5
Stochastic Simulation	MP	1		4
Statistical Analysis of Systems	MP	1		6
Uncertainty Quantification	MP	1		6
Applied Statistics	MP	1		9
Random Graphs	MP	1		5
Probabilistic Forecasting and Data Assimilation	MP	1		5
B. Minor subject elective modules				
Theory of Potential Methods	MP	1		4
Microbiology for Resource Scientists: Lecture	KA	1		3
Introduction to Meteorology and Climatology	KA	1		4

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Module	Type of Exams and Prerequisites	Weighting within the Module	Special Requirements for Admission	CP
Ecosystems	AP (paper (15 pages))	1		4
Molecular Ecology of Microorganisms	KA PVL (Accepted protocols for lab course) PVL (Acceptable oral seminar presentation)	1 0 0		4
Inverse Problems in Geophysics	AP (Solution of Exercises)	1		6
Theory of Electromagnetic Methods	MP	1		4
Continuum Multiphysics in the Geosciences	MP/KA (KA if 4 students or more)	1		4
Introduction to Machine Learning and Big Data	MP/KA (KA if 15 students or more)	1		6
Advanced Theory of Potential Fields	MP	1		4
Basics of Climate Change for Non-Geologists	KA AP (Performance in the exercises and student paper)	1 2		5
Microbiology of Fossil and Regenerative Energy Resources	MP PVL (Accepted protocols for lab course.) PVL (Oral presentation in the seminar.)	1 0 0		4
Numerical Simulation Methods in Geophysics	AP (Solution of Exercises)	1		6
Applied Problems in Data Science	KA	1		4
Mathematical Problems in Resource Science	KA	1		4
C. German Language** A maximum of one module can be selected.				
German B1/ 1st Semester	KA PVL (Active participation in lessons at least 80%)	1 0	German A2/ 2nd Semester oder äquivalente Sprachkenntnisse	4
German A1/ 2nd Semester	KA PVL (Active participation in lessons at least 80%)	1 0	German A 1/ 1st Semester oder äquivalente Sprachkenntnisse	4

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Module	Type of Exams and Prerequisites	Weighting within the Module	Special Requirements for Admission	CP
German B1/ 2nd Semester	KA PVL (Active participation in lessons at least 80%)	1 0	German B1/ 1st Semester oder äquivalente Sprachkenntnisse	4
German B2/ 1st Semester	KA PVL (Active participation in lessons at least 80%)	1 0	Deutsch B1/ 2.Semester oder äquivalente Sprachkenntnisse	4
German A2/ 1st Semester	KA PVL (Active participation in lessons at least 80%)	1 0	German A1/ 2nd Semester oder äquivalente Sprachkenntnisse	4
German B2/ 2nd Semester	KA PVL (Active participation in lessons at least 80%)	1 0	German B2/ 1st Semester abgeschlossenes B1-Niveau	4
German A2/ 2nd Semester	KA PVL (Active participation in lessons at least 80%)	1 0	German A2/ 1st Semester oder äquivalente Sprachkenntnisse	4

Legend:

MP = Mündliche Prüfungsleistung (oral exam)

KA = Klausurarbeit (written examination)

AP = Alternative Prüfungsleistung (alternative assessment)

PVL = Prüfungsvorleistung (prerequisite)

MP/KA = mündliche oder schriftliche Prüfungsleistung (abhängig von Teilnehmerzahl) / written or oral exam (dependent on number of students)

In the case of MP/KA (written or oral exam depending on number of students) the number of students (if not otherwise regulated in the examination schedule above) are determined on the basis of the number of students attending the course by the fifth week of the semester at the latest and accordingly the type of examination is announced.

* In modules requiring more than one examination, this examination has to be passed or completed with at least "ausreichend" (4,0), respectively.

**The catalogues of elective modules can be changed by the Faculty Council of the Faculty of Mathematics and Computer Science at the suggestion of the Study Commission. The changed catalogues of elective modules must be announced at the beginning of the semester by means of a notice.

As per § 13 sub-paragraph 4 in conjunction with § 36 sub-paragraph 1 of the Higher Education Act of the Free State of Saxony (SächsHSFG) of January 15th 2013 (SächsGVBl. p. 3) (most recently changed by Act from Juni 1st, 2022, SächsGVBl. p. 381) the Faculty Council of the Faculty of Mathematics and Computer Science at the Technische Universität Bergakademie Freiberg, in consultation with the Senate, agreed on the following study regulations for the Master's degree program in Mathematics for Data and Resource Sciences :

Study Regulations for the Master's Degree Program in Mathematics for Data and Resource Sciences at the Technische Universität Bergakademie Freiberg

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Appendix 1: Study Schedule

Appendix 2: Module Descriptions

§ 1 Scope

The existing study regulations regulate the aim, content and structure of the Master's degree program in Mathematics for Data and Resource Sciences on the basis of the examination regulations of the international Master's degree program in Mathematics for Data and Resource Sciences at the TU Bergakademie Freiberg.

§ 2 Aims of the Degree Programme

(1) Since the founding of the Bergakademie more than two hundred years ago, the application orientation of the mathematicians working here has been just as much a part of the proven tradition as the pronounced willingness of natural scientists, engineers and economists to integrate mathematics into their own field. This holistic view of mathematics, which has grown historically in Freiberg, is to be preserved by the study programme Mathematics for Data and Resource Sciences on the one hand and enriched by the two specialisations on the other hand, based on the realisation that true interdisciplinarity in mathematics-heavy disciplines can be shaped by applied and applied mathematical expertise.

(2) The aim of the education is to prepare students for a professional career as a mathematician. Alumni of the degree programme possess a solid basic knowledge of mathematics, in-depth knowledge of pure and applied mathematics, master a broad spectrum of mathematical methods and are able to apply these to practically relevant problems. Practical relevance is ensured on the one hand by the specialisations in data science and geomathematics (resource science) and on the other hand by the special role of the industrial internship.

The specialist knowledge and skills acquired during the degree programme enable students to work independently in their profession.

Within the framework of this Master's programme, students are confronted with the results of current research in a mathematical sub-area, which subsequently form the basis for largely independent scientific work within the framework of the Master's thesis.

The alumni of the degree programme are able to analyse, process and generalise complex mathematical problems (also with reference to applications). Formally correct proofs as well as strategies for method transfer both in the field of mathematics and in the application of mathematics are among their most important competences. The Master's thesis has the function of training under guidance for future professional use by working on an advanced scientific problem from mathematics as a project. This requires the competences acquired during the degree programme in abstraction, the exploitation of existing results for their further development or application, the analysis of facts with regard to mathematically describable structures and subsequent mathematical modelling. This is supplemented by the ability to implement mathematical procedures for complex problems on the computer.

Within the framework of the preparation of the Master's thesis and its defence, the students prove that they are able to present their results appropriately in writing and orally and to discuss them scientifically.

Particular importance is attached to the application reference that runs through the entire degree programme, which can find a climax in the industrial internship in

particular. This prepares students for future interdisciplinary work in practice and at the same time increases their professional aptitude and career opportunities. Employment opportunities for alumni of the programme open up in industrial and commercial companies as well as in the public sector in numerous areas, such as software development, telecommunications and multimedia applications or a wide range of engineering service providers.

§ 3

Type of Degree Program

The Master's degree program in Mathematics for Data and Resource Sciences is a consecutive Master's degree program with a strong emphasis on research.

§ 4

Admission Requirements

(1) The requirements for admission to the Master's degree program in Mathematics for Data and Resource Sciences are:

1. first university degree from the Bachelor's program in the field of Mathematics from the TU Bergakademie Freiberg or in a program related to the natural sciences with in-depth mathematical training
2. a first university degree from a degree program similar to that in No. 1. from another university or
3. a first university degree that is at least equivalent in subject from a university with a prescribed period of study of at least 6 semesters and
4. a successful eligibility interview in accordance with appendix 3 in the desired field of study and
5. the proof of English language skills by an acknowledged language test as for example the Test of English as a Foreign Language (TOEFL) with at least 90 points (internet-based test). Alternatively, the International English Language Test System (IELTS) with a grade of at least 6.5 or an equivalent test with a comparable result will be accepted. This does not apply for foreign applicants whose national language is English or whose last educational achievement has been attained in English language; and
6. a letter of motivation (max. 1 DIN A4 page) written by the applicant explaining the reasons for taking up the study programme.

(2) A university degree is equivalent in the sense of sub-paragraph 1 No. 1 when the coursework and examinations essentially conform to those of a Bachelor degree program in Mathematics of the TU Bergakademie Freiberg in content, scope and standard or in their demonstrable learning outcomes. For this purpose, overall consideration and evaluation is undertaken and not a schematic comparison.

(3) The Examination Board can, at the instigation of the Commission for Determining Eligibility, issue the applicant holding a university degree in accordance with sub-paragraph 1, No. 2 or 3 with the condition of passing certain coursework and examinations within a certain time span, however at the latest until the student receives the topic of the Master's thesis.

(4) Beyond this, the enrollment regulations of the TU Bergakademie Freiberg apply.

§ 5

Duration of Studies, Study Volume and Commencement of Studies

- (1) The prescribed period of study is 4 semesters
- (2) In the Master's degree program in Mathematics for Data and Resource Sciences, 120 credit points must be acquired.
- (3) Studies commence in the winter semester.

§ 6

Student Advice

- (1) In addition to general advice concerning studies from the Central Student Advisory Service, a Departmental Advisory Service is provided by the Dean of Studies or the education coordinator for the Master's degree program in Mathematics for Data and Resource Sciences. This contains, among other things, advice on study requirements, study schedules, examination issues, changing university, periods of study abroad and career entry opportunities.
- (2) Students that have not passed a module examination by the beginning of the third semester should take part in a consultation at the Departmental Student Advisory Service during the third semester.

§ 7

Program Structure

- (1) The degree program is composed of 4 semesters and is concluded with the Master's examination.
- (2) The Master's thesis is written in the course of the 3rd or 4th semester. Further details concerning the Master's thesis and colloquium are regulated in the examination regulations of the international Master's degree program in Mathematics for Data and Resource Sciences.
- (3) Separable subject or topic related areas are integrated into self-contained modules. These encompass subject-related courses of various types (§ 8 sub-paragraph 1) and are concluded with module examinations, for which, if passed, credit points are acquired. Module examinations lead, together with the Master's thesis including the colloquium, to graduation. The modules, along with their workload and assigned credit points, are presented in the module descriptions.

§ 8

Methods of Instruction and Assessment

- (1) Courses (Lehrveranstaltungen, LV) can be lectures (Vorlesungen, V), workshops (Übungen, Ü), seminars (Seminaren, S), practicals (laboratories, fieldwork, internships etc.) (Praktika, P) and other types of courses. In lectures, theoretical knowledge is presented. In workshops, material from the lectures and background knowledge necessary for understanding the lectures is revised, practised and consolidated. Seminars lead the student's to independent scientific work through discussions and their own presentations. The aim of practicals, besides the consolidation of theoretical knowledge, is to learn methods and other practical skills.

(2) Courses are conducted in English language.

(3) The size of courses is measured in "semester week hours" (Semesterwochenstunden, SWS). One SWS describes a unit of time of generally 45 minutes per week throughout the entire lecture period of a semester (about 15 weeks). Courses can also be carried out in blocks.

(4) Supplementary to attending courses, students must work independently to consolidate material from the modules and especially in the cases of practicals, workshops and seminars, prepare and follow up. To attain the necessary knowledge, additional independent reading is generally indispensable.

(5) Assessments can be oral presentations, papers, reports, written or oral tests or something else. They are evaluated but not necessarily graded. Details are given in the module descriptions.

§ 9 Provision of Courses

(1) The university ensures through its course program that the module examinations, in accordance with the examination regulations for Mathematics for Data and Resource Sciences, can be taken within the deadlines stipulated. The study schedule (Appendix 1) enables graduation within the prescribed period of study.

(2) Module examinations usually take place in the semester in which the module courses finish. For modules that run over several semesters, examinations take place in the semester stated in the examination schedule. Repeat examinations, as far as is possible, can be taken in the following semester.

(3) At the end of each academic year, the Examination Board, along with the Study Commission, checks if the education according to the study schedule needs to be updated. This should take place so that the necessary changes in the program planning can be in place in time for the new academic year.

§ 10 Course Program

(1) The modules and their recommended sequence, as well as the type and size of their courses, are stated in the study schedule of the respective fields of study (Appendix 1). The courses aim to cover the material needed for these modules. Details of this can be found in the module descriptions.

(2) Students can take additional optional modules. Further details can be found in the examination regulations.

Appendix 1: Study Schedule

Modul	1. Sem. V/Ü/S/P	2. Sem. V/Ü/S/P	3. Sem. V/Ü/S/P	4. Sem. V/Ü/S/P	CP
Obligatory modules					
Basics in Partial Differential Equations	2/1/0/0				4
Deutsch A1/ 1. Semester	0/4/0/0				4
Geomodelling – Geostatistics for Natural Resource Modelling	2/0/0/2				5
Mathematik des maschinellen Lernens	3/1/0/0				6
Seminar Mathematics for Data and Resource Sciences			0/0/2/0		6
Master Thesis (Mathematics for Data and Resource Sciences)				9 Moths	30
Elective Modules**					
Modules totalling 65 credit points have to be chosen from the following catalogues of elective modules. Whereas modules totalling 49 credit points have to be chosen from the catalogue mathematic elective modules and modules totalling 4 credit points have to be chosen from the catalogue minor subject elective modules.					
A. Mathematic elective modules					
A. Mathematic elective modules: Analysis					
Inverse Problems	2/1/0/0				5
Differential Geometry (nur alle 2 Jahre)	2/1/0/0				5
Selected Topics in Applied Operator Theory (nur alle 2 Jahre)		2/1/0/0			5
Mathematics of Crystallographic Texture Analysis		2/1/0/0			5
Selected Topics in Partial Differential Equations		2/1/0/0			5
Wavelets (nur alle 2 Jahre)		3/1/0/0			6
Global Analysis (nur alle 2 Jahre)		2/1/0/0			5
Fourier Analysis (nur alle 2 Jahre)			2/1/0/0		5
Mathematical Image Processing (nur alle 2 Jahre)				3/1/0/0	6
A. Mathematic elective modules: Discrete Mathematics/ Algebra					
Algorithmische Graphentheorie	2/1/0/0	2/1/0/0			9
Topological Data Analysis		2/2/0/0			6
Algorithmik		2/2/0/0			6
Methods of Applied Algebra		2/2/0/0			6
Algorithmische Geometrie			2/2/0/0		6
Geometry and Topology			2/2/0/0		6
A. Mathematic elective modules: Numerics/ Optimisation					
Aktuelle Themen der Numerik I	3/0/0/0				6
Scientific Computing Project	0/0/3/0				6

Modul	1. Sem. V/Ü/S/P	2. Sem. V/Ü/S/P	3. Sem. V/Ü/S/P	4. Sem. V/Ü/S/P	CP
Modellierung und Simulation (nur alle 2 Jahre)	4/2/0/0				9
Introduction to High Performance Computing and Optimization	2/1/0/0				4
Aktuelle Themen der Numerik II		3/0/0/0			6
Vektoroptimierung (nur alle 2 Jahre)		2/2/0/0			6
Parallel Computing (nur alle 2 Jahre)		3/1/0/0			6
Finite-Element-Methoden für Mathematiker (nur alle 2 Jahre)		4/2/0/0			9
Numerik nichtlinearer Optimierungsprobleme und nichtlinearer Gleichungssysteme (nur alle 2 Jahre)				4/2/0/0	9
Stochastische Optimierung (nur alle 2 Jahre)				3/1/0/0	6
A. Mathematic elective modules: Stochastics					
Multivariate Statistik und Zeitreihenanalyse (nur alle 2 Jahre)	2/1/0/0	2/1/0/0			9
Statistical Shape Analysis (nur alle 2 Jahre)	2/1/0/0				5
Stochastische Geometrie und räumliche Statistik (nur alle 2 Jahre)	2/1/0/0	2/1/0/0			9
Methods in Machine Learning		2/1/0/0			5
Stochastische Simulation (nur alle 2 Jahre)		2/1/0/0			4
Statistische Analyse von Systemen		2/2/0/0			6
Uncertainty Quantification (nur alle 2 Jahre)			3/1/0/0		6
Angewandte Statistik (nur alle 2 Jahre)			2/1/0/0	2/1/0/0	9
Random Graphs (nur alle 2 Jahre)			2/1/0/0		5
Probabilistic Forecasting and Data Assimilation (nur alle 2 Jahre)				2/1/0/0	5
B. Minor subject elective modules					
Theory of Potential Methods	2/1/0/0				4
Microbiology for Resource Scientists: Lecture	2/0/0/0				3
Introduction to Meteorology and Climatology	2/2/0/0				4
Ecosystems	1/2/0/0				4
Molecular Ecology of Microorganisms	1/0/1/1				4
Inverse Problems in Geophysics		2/2/0/0			6
Theory of Electromagnetic Methods		2/1/0/0			4
Continuum Multiphysics in the Geosciences		2/0/0/0			4
Einführung Machine Learning und Big Data		2/2/0/0			6

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Modul	1. Sem. V/Ü/S/P	2. Sem. V/Ü/S/P	3. Sem. V/Ü/S/P	4. Sem. V/Ü/S/P	CP
Advanced Theory of Potential Fields			2/1/0/0		4
Basics of Climate Change for Non-Geocologists			2/0/1/0		5
Microbiology of Fossil and Regenerative Energy Resources			1/0/1/1 + Exc. 0.5 SWS		4
Numerical Simulation Methods in Geophysics			2/2/0/0		6
Applied Problems in Data Science			2/0/0/0		4
Mathematical Problems in Resource Science			2/0/0/0		4
Elective Modules: C. German language** A maximum of one module can be selected.					
Deutsch B1/ 1. Semester	0/4/0/0				4
Deutsch A1/ 2. Semester		0/4/0/0			4
Deutsch B1/ 2. Semester		0/4/0/0			4
Deutsch B2/ 1. Semester			0/4/0/0		4
Deutsch A2/ 1. Semester			0/4/0/0		4
Deutsch B2/ 2. Semester				0/4/0/0	4
Deutsch A2/ 2. Semester				0/4/0/0	4

**The catalogues of elective modules can be changed by the Faculty Council of the Faculty of Mathematics and Computer Science at the suggestion of the Study Commission. The changed catalogues of elective modules must be announced at the beginning of the semester by means of a notice.

Appendix 2: Module Descriptions

Adaptation of Module Descriptions

The following components in the module descriptions can be modified in agreement with the Dean of Studies:

1. Level of the module
2. Responsible (Verantwortlich)
3. Lecturer(s) (Dozent(en))
4. Institute(s) (Institut(e))
5. Competencies (Qualifikationsziele/Kompetenzen)
6. Contents (Inhalte), if it goes beyond the necessary description of the subject of the examination
7. Literature (Typische Fachliteratur)
8. Pre-requisites (Voraussetzungen für die Teilnahme), if only recommendations are included here (thus not necessarily fulfilled))

The changed module descriptions are announced at the start of the semester. The Deans of Studies" of the degree programmes, in which the module is an obligatory module, elective module or specialization module, have to be informed immediately.