

**6.10.84 Executive Regulations for the
Master Studies in Mining Engineering
at the Technical University Clausthal,
Faculty for Energy and Business Administration
of 16 September 2014**

Version of the 5. alteration of June 23, 2020

On 16 September 2014 the Faculty for Energy and Business Administration issued the following Executive Regulations in compliance with § 7 sect. 3 in conjunction with § 44 sect. 1 of the University Act of the Federal State of Lower Saxony (NHG). These were approved and enacted by the President of the Technical University Clausthal on 23 September 2014 according to § 37 sect. 1 no. 5 lit. B NHG (Off. Gaz. TUC 2014, p. 201). These were approved and enacted by the President of the Technical University Clausthal on July 12, 2016 according to § 37 sect. 1 no. 5 lit. B NHG. These were approved and enacted by the President of the Technical University Clausthal on June 27, 2017 according to § 37 sect. 1 no. 5 lit. B NHG. These were approved and enacted by the President of the Technical University Clausthal on May 08, 2019 according to § 37 sect. 1 no. 5 lit. B NHG. Last amended by the faculty board decree from June 23, 2020 and the authorisation from the chairmanship from July 14, 2020

Preamble

These Executive Regulations shall be only applicable in conjunction with the General Examinations Directive (APO) of the Technical University Clausthal in the respectively valid version, and they contain all studies-specific amendments and regulations.

Studies Objectives

(1) The consecutive Master studies course in Mining Engineer in the English Language is designed as a specialist training for engineers enabled to understand and implement the increasingly complex issues in the field of raw material supply and exploitation regarding the raw material demand under special consideration of sustainability aspects for the future. On the basis of skills and experience gained in the Bachelor studies professional expertise is to be enhanced and the students are to be enabled to apply the skills, methods and experience in problem-oriented analyses and solutions finding processes. The graduates are to be provided with a wide range of competences, methods and expertise for domestic and international activities.

The definition of the Mining Engineering studies course in the technical and scientific context covers all measures for exploration and exploitation of natural resources and re-cultivation.

(2) Because of the relatively wide range of challenges in the studies in Mining Engineering in the English language at a German University and the extensive dynamics in the practical demands on the students in engineering there is no further differentiation into several different disciplines.

(3) The Master studies course in Mining Engineering is intended to scientifically qualify the graduates for professional activities requiring basic and current scientific findings and methods. The graduate is to be enabled by the teachings and the practice-oriented courses to be quickly integrated in the work and tasks of a raw material enterprise and to actively participate in corporate activities.

(4) The knowledge and skills gained in the courses and the key competences obtained in the Master training enable the graduate to pursue a career based mainly on specialist expertise and professional experience all the way to the assumption of managerial tasks and positions in the raw material and related industries.

(5) In order to reach this objective additionally the following skills need to be developed during the courses

- ❖ Uptake and processing of knowledge,
- ❖ Analytical thinking,
- ❖ Planning, organizing and deciding,
- ❖ Argumentation and communication,
- ❖ Team work

(6) The courses convey the basic knowledge and skills of an engineer in working raw material supply technology. The basis for this is a broad and generalized basic knowledge in the fields of natural sciences, engineering, geosciences law and business administration, as well as in the field of social competences.

(7) As a superior learning objective the graduates in Master studies shall be introduced to interdisciplinary engineering procedures in the exploration, surveying and exploitation of raw materials, in re-cultivation, further processing and the legal conditions and consequences.

(8) In the scope of the practice-oriented training laboratory internships are provided to convey specific practical skills. The Student Research Project as well as seminars and the Master dissertation shall enable the students to independently identify and resolve specific problems and issues in the field of raw material supply technology in a qualitative and quantitative manner.

(9) The objective of the Master studies course in Mining Engineering are as follows:

- ❖ Enhancement and broadening of professional competences gained in the previous Bachelor studies courses.
- ❖ Qualification for the resolving of complex problems and issues and for independent scientific work in the specialist field and complex of energy and resource supply technology.

On § 2 Student Advisory Service

As part of the Mentor / Tutor Programme the TU Clausthal provides students with the possibility to receive individual subject advice and consultation by a faculty professor (mentor) and the responsible subject advisor.

On § 4 University Degree

The awarding of an academic degree of a Master of Science enables the student to obtain an internationally acceptable degree as proof of the attained relevant knowledge and subject-specific competences for the professional practice. Also, this profession-specific degree increases the compatibility between the various educational system in different countries, enhancing the international attractiveness of studying at TU Clausthal.

On § 5 ECTS Points, Modules, and Executive Regulations

Addition to sect. 2:

A listing of the credit points (CP) per course or lecture and module is attached in Annex 1.

Addition to sect. 4:

A description of all modules including the associated studies and training courses is available in the module manual.

On § 6 Studies Duration and Structure

Addition to sect. 2:

The regular studies duration for a Master studies course in Mining Engineering in a full time schedule is, incl. the dissertation, four semesters or half-year terms. The studies comprise a total of 120 ECTS points incl. 21 ECTS points for the Master dissertation incl. final presentation (see model studies schedule in Annex 1b).

The curriculum includes a professional practical internship totalling eight weeks (four weeks in pre-training and four weeks specialist internship). Periods absolved as part of a professional training may be taken into account as industrial internship. Details are available from the General Internship Guidelines of the TU Clausthal in conjunction with the Internship Regulations for the Master Studies Course in Mining engineering in the respectively valid version.

On § 7

Admission Conditions

Admission to the Master studies course in Mining Engineering is regulated by the “*Ordnung über den Zugang für den konsekutiven Master-Studiengang Mining Engineering an der Technischen Universität Clausthal, Fakultät für Energie- und Wirtschaftswissenschaften*” [Directive on the admission to the consecutive Master studies course in Mining Engineering at the Technical University Clausthal, Faculty for Energy and Business Administration] in the respectively valid version.

On § 11

Examination Admission

Addition to sect. 1:

(1) A candidate who complies with the admission requirements according to § 11 APO and who has completed the compulsory examination qualifications as specified in Annex for the respective module will be admitted to the module or partial module examination.

Addition to sect. 4:

(1) A special admission is required for the Master dissertation according to § 11 APO. In the application the primary reviewer must be named.

(2) A candidate who complies with the admission requirements according to § 11 APO and who has accumulated more than 80 credit points as well as having completed the industrial internship and seminar successfully will be admitted to begin the Master dissertation. Exceptions can be made on application to the examination committee prior to beginning with the Master dissertation; however, the industrial internship is compulsory and cannot be excepted for the admission.

(3) Before students apply for admission to the first compulsory optional examination all students of the Master studies course in Mining Engineering are recommended to assess and agree the selection of the compulsory optional modules with the subject advisor.

(4) With the first examination attempt the selection of the compulsory optional module becomes binding. Changing a compulsory optional module is only possible if no examination has been attempted or is counted as having been attempted in any module.

Addition to sect. 6:

A candidate who has failed to finally pass a comparable examination in the same or a comparable studies course according to § 19 at a university or a comparable higher education institution in the Federal Republic of Germany or in the European Higher Education Area will not be admitted to a module examination. In case of doubt the responsible subject advisor will assess the comparability of studies courses.

On § 14

Examination Structure, Supplementary Performance

Type and Scope of the Master Examination:

- (1) The Master examination consists of module examinations, performance certificates and the Master dissertation according to § 16 APO. The module examinations are taken in parallel to the studies.
- (2) The modules consist of compulsory subjects and compulsory optional subjects. The compulsory subjects are compulsory for all students for whom the respective module is compulsory. The compulsory optional subject can be selected from various modules. The regulations and restrictions of § 11 sect. 4 must be observed.
- (3) For certain modules special prior conditions must be met, but this will not be taken into account for the determination of the module grading.

On § 15

Examination Performance Types

- (1) Attestations and certificates can be used as accessories for examination performance assessment purposes. They are associated to precisely one single examination performance and are used for studies-parallel performance assessment. In the assessment of certificates individual criteria can be including, such as minimum attendance, home exercises and oral or written tests. Certificate assessments are not explicitly displayed in the examination report, but subject to the decision of the examiner can be taken into account at a rate of up to 25%. It must be possible to pass an examination completely without certificates or attestations. Acquired attestations and certificates can, subject to the decision of the examiner, remain intact and in force even if the examination itself has not been passed. The modalities for the processing of attestations and their inclusion in the examination grades must be announced by the respective examiner in the module sheets and at the latest at the beginning of the module on the bulletin board.
- (2) All teaching is in the English language. All written examinations are conducted in the English language. Oral tests and interviews can be held in German or English, subject to the examiner's decision at the time of agreeing the appointment for the test.

On § 16

Dissertation

Addition to sect. 6:

- (1) The Master dissertation comprises 21 credit points (incl. final presentation) and is normally to be completed within a period of four months. An extension to six months is possible upon application. The admission to the Master dissertation is according to the regulations of § 11 sect. 4 APO. Students shall present the objective, applied methods and / or procedures as well as the results achieved in their Master dissertation to at least one reviewer, and to defend this in a subsequent discussion.
- (2) The Master dissertation must be produced in the English language.

On § 18
Assessment of Examination Performance, Grading

The total grading of the Master examination is determined according to § 18 APO. Modules, for which only performance certificates are issued, will not be taken into account in the determination of the total grade.

The total grade for a module is calculated according to the weighting specified in Annex 1 a.

On § 19
Free Attempt, Examination Repetition

Addition to sect. 6:

Unsuccessful module and partial module examination attempts from other studies will be taken into account in the determination of the repetition possibilities according § 19 APO, particularly from studies courses for Master and Diploma degrees at higher education institutions in the European Higher Education Area (cf. § 19 APO) in the fields:

- Energy and Raw Material Supply Technology,
- Mining,
- Petroleum / Natural Gas Engineering,
- Geotechnology.

In case of doubt the responsible subject advisor will assess the comparability and association of studies courses to the listed fields.

Addition to sect. 7:

The oral supplemental examination according to § 19 sect. 7 APO one candidate is interviewed by one examiner and one assessor or observer qualified as an examiner for the subject tested. If such an assessor is not available for an examination one member of the group of professors in the Examinations Committee will be appointed as an observer. The duration of an oral supplemental examination shall be no less than 20 minutes and no more than 30 minutes.

The examination is considered as passed if the oral supplemental examination is awarded the grade “satisfactory (3.0)” or better. The final grade for the module examination (written examination and oral supplemental examination) cannot be better than “sufficient (4.0)”.

On § 21
Default, Fraud, Exceptions

Addition to sect. 8:

The Master studies course Mining Engineering is not suited for part-time students.

On § 28
Enactment

These Executive Regulations shall become effective on the day of their publication in the Official Gazette of the TU Clausthal.

Implementary regulations for the version of the 1st alteration of June 23, 2015

(1) Students starting their courses of studies in winter semester 2015/2016 will be examined according to this version of the executive regulations.

(2) Students who have been registered before winter semester 2015/2016 in this course of study will be transferred to these transitional regulations. The following temporary provisions apply for them:

- Students having successfully passed the previously applying modules 1 or 6 will still obtain the corresponding credits.
- Possible failed attempts to pass the substituted module examinations will not be credited to the partial module examinations according to these implementary regulations.
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(3) If the change leads to possible disadvantages, a hardship regulation can be set up by the chairman of the examination board in individual cases and upon request.

Implementary regulations for the version of the 2st alteration of June 07, 2016 ^{#)}

(1) Students starting their courses of studies in winter semester 2016/2017 will be examined according to this version of the executive regulations.

(2) Students who have been registered before winter semester 2016/2017 in this course of study will be transferred to these transitional regulations.

(3) If the change leads to possible disadvantages, a hardship regulation can be set up by the chairman of the examination board in individual cases and upon request.

^{#)} 2nd. Alteration of 07.06.2016

Transitional provisions for the 3rd amendment from 13 June 2017

(1) Students who commence their studies in this degree programme in the winter semester 2017/2018 will be examined in accordance with this version of the implementation regulations.

(2) Students already enrolled in this degree program at TU Clausthal before the winter semester 2017/2018 will be transferred into this version of the implementation regulations. For them, the following transitional provisions apply:

- Students who have already successfully passed the previously valid module „Module 5: Advanced Drilling Technology“ will keep the credits for this module.
- Students who have already performed in the previously valid module „Module 5: Advanced Drilling Technology“ but have not yet completed it, will be offered an option for examination for the previously valid module until the end of the summer semester 2018. Students can only register for this module examination by submitting a form (Application for Admission to Examinations [Antrag auf Zulassung zu Prüfungen]) at the Examination Office. As an alternative, the new module „Module 5a: Surface and Underground Drilling“ may be completed.
- Failed examination attempts for the replaced compulsory module „Module 5: Advanced Drilling Technology“ will not be included in the examination of the new compulsory module „Module 5a: Surface and Underground Drilling“ according to this version of the implementation regulations.

(3) Any hardships resulting from a change may be compensated on application for a case-by-case based decision by the Examination Committee.

Transitional regulations to the 4th amendment of April 23, 2019

(1) Students who begin their studies in this study programme from winter semester 2019/2020 onwards at Clausthal University of Technology will be examined in accordance with this version of the implementation rules.

(2) Students who were already enrolled in this programme at Clausthal University of Technology before the winter semester 2019/2020 will be transferred to be subject to this version of the implementation rules. The following transitional regulations will apply for them:

- Students who have already successfully completed the compulsory module "Module 12: Advanced Surface Mining" with the module examination will continue to receive credits for this module.
- Students who have already performed in the compulsory module "Module 12: Advanced Surface Mining" but have not yet completed it will be examined according to the new regulations (partial module examinations) starting in winter semester 2019/20.

(4) Any hardships resulting from a change can be compensated on application by individual decisions of the examination board.

Transitional regulations to the 5th amendment of June 23, 2020 ¹

- (1) Students who begin their studies in this study programme from winter semester 2020/2021 or later will be examined in accordance with this version of the Implementation Rules.
- (2) Students who were already enrolled in this programme at Clausthal University of Technology before the winter semester 2020/2021 will be transferred to be subject to this version of the Implementation Rules. The following transitional regulations will apply for them:
 - Students who have already successfully completed the compulsory module "Module 3: Geoinformation Systems" and/or the compulsory module „Module 9: Advanced Mine Surveying" with the module examination will continue to receive credits for this/these module(s).
 - Students who have already passed the previous module examination in the compulsory module "Module 3: Geoinformation Systems" and/or the compulsory module „Module 9: Advanced Mine Surveying" within the framework of the free trial, will be given the opportunity to take an examination to improve their grades in accordance with § 20 (1) of the General Examination Regulations (APO) by the summer semester 2021 after consultation with the Faculty of Energy and Economics. Applications for the module examination within the course of the free trial for grade improvement can only be submitted to the Examination Office using the official application form (Application for Admission to Examinations).
 - Any failed attempts of the replaced module examinations will not be credited to the new module partial examinations according to this version of the Implementation Rules.

¹ 5th amendment of the Implementation Rules of 23.06.2020

Annex 1 a: Modules of the Master Studies Course Mining Engineering

Course Type	SWS	cpi	T _{type} ⁽¹⁾	T _{type} (2)	Assessment ₍₃₎	Emphasis
Compulsory Subjects						
Module 1: Shaft Sinking	4	6				6/114
Shaft Sinking and Deep Foundations	2	3	PF	2V	K/M	0,8 ¹⁾
Tutorial for Shaft Sinking and Deep Foundations		3	PF	1 ₂ 2U	S	0,2
Module 2: International Mining	4	6				6/114
International Mining	1	2	PF	2V	M	0.5
Seminar for International Mining	1	1	PF	1S		
Mining and Finance	1	2	PF	2V	Ab	0.5
Tutorial for Mining and Finance	1	1	PF	10		
Module 3: Geoinformation Systems	5	6				6/114
Geoinformation Systems	2	3	PF	2V	K/M	0,6 ²
Tutorial for Geoinformation Systems	1	1	PF	1 U		
GIS-based analysis and surface modelling	2	2	PF	2U	K/M	0,4
Module 4: Mineral Resources	4	6				6/114
Economic Geology	2	3	PF	2V	K/M	0.5
Geostatistics	2	3	PF	2V	K/M	0.5
Module 5a: ♦) Surface and Underground Drilling	3	3				3/114
Surface and Underground Drilling	2	3	PF	2V	K/M	1
Tutorial for Surface and Underground Drilling	1		PF	1Ü		
Module 6: Ventilation and Climatization – Advanced level	4	6				6/114
Ventilation and Climatization – Advanced Level	2	3	PF	2V	K/M	0,8 ¹⁾
Tutorial for Ventilation and Climatization – Advanced level	2	3	PF	2U	S	0,2
Module 7: Underground Mining Equipment (UME)	4	6				6/114
Mining Machinery & Equipment	2	3	PF	2V	K/M	1
Excavation Machines	2	3	PF	2V		

¹ CP = ECTS point: The work load is measured in ECTS points according to the European Credit Transfer and Accumulation System; see APO § 5

¹⁾ 1. Alteration of June, 23, 2015

² 5. Alteration of June 23, 2020

♦) 3. Alteration of June, 13, 2017

Module 8: Advanced Rock Mechanics	4	6				6/114
Advanced Rock Mechanics	2	3	PF	2V	K	1
Tutorial for Advanced Rock Mechanics	2	3	PF	2U		
Module 9: Advanced Mine Surveying	4	6				6/114
Strata and Ground Movements	1	2	PF	1V	K/M	0,5 ³
Mine Plans	1	1	PF	1V		
Remote Sensing	1	2	PF	1V	K/M	0,5
Tutorial for Remote Sensing	1	1	PF	1U		
Module 10: Mineral Processing	3	3				3/114
Mineral Processing	2	2	PF	2V	K	1
Tutorial for Mineral Processing	1	1	PF	10		
Module 11: Underground Mine Planning (UMP)	4	6				6/114
Underground Mine Planning	2	3	PF	2V	K/M	1
Tutorial for Underground Mine Planning	2	3	PF	2U		
Module 12: Advanced Surface Mining	4	6				6/114
Advanced Surface Mining	2	3	PF	2V	PA	0,5 ⁴
Mining and Environment	2	3	PF	2V	K/M	0,5
Module 13: Applied Rock Mechanics	4	6				6/114
Applied Rock Mechanics	2	3	PF	2V	K	1
Tutorial for Applied Rock Mechanics	2	3	PF	2U		
Module 14: Seminar	2	3				3/114
Seminar on Mining Engineering	2	3	PF	S	S	1
Module 15: Industry Internship	1	6				0
Industry Internship	1	6	PF	PLN	B	0
Module 16: Student Research Project	3	6				6/114
Student Research Project	3	6	PF	H	AB	1
Module 17: Master Thesis	14	21				21/114
Master Thesis	14	21	PF	H	AB	0.8
Final Presentation	0	0	PF	Pra	KO	0.2

³ 5.Alteration of June23, 2020

⁴ 4. Alteration of April, 23, 2019

Compulsory Optional Subjects (four out of ten)

Precisely four modules with a total of 12 credit points must be selected from the subject-specific compulsory optional subjects. The selection of a module is binding at the point of examination. Any additionally passed module examinations not previously passed can only be counted as supplemental exams.

The list of available modules can be updated on an annual basis for the subsequent year by decision of the Faculty Council.

Updated lists are published in the university by the Studies Centre:

<http://www.studium.tu-clausthal.de/studienangebot/energie-und-rohstoffe/mining-engineering-master/>

Module 18.1: Specialized Driving Methods	2	3				3/114
Specialized Driving Methods	2	3	WPF	2V	K	1
Module 18.2: Project Development in Underground Primary Production	2	3				3/114
Project Development in Underground Primary Production	2	3	WPF	2V	K	1
Module 18.3: Underground Blasting	2	3				3/114
Underground Blasting	2	3	WPF	2V	K/M	1
Module 18.4: Software for Underground Mine Planning	2	3				3/114
Software for Underground Mine planning	2	3	WPF	2V	K/M	1
Module 18.5: Advanced Drilling Engineering II	2	3				3/114
Advanced Drilling Engineering II	2	3	WPF	2V	K/M	1
Module 18.6: Natural Gas Storage in Rock Caverns	2	3				3/114
Natural Gas Storage in Rock Caverns	2	3	WPF	2V	M	1
Module 18.7: Advanced Underground Mining	2	3				3/114
Advanced Underground Mining	2	3	WPF	2V	K/M	1
Module 18.8: Underground Emergency Response I	2	3				3/114
Underground Emergency Response I	2	3	WPF	2V	K	1
Module 18.9: Underground Emergency Response II	2	3				3/114
Underground Emergency Response II	2	3	WPF	2V	K	1
Module 18.10: Sustainability in Underground Mining	2	3				3/114
Sustainability in Underground Mining	2	3	WPF	2V	K	1

* These compulsory optional modules cannot be selected by students who have studied the respective module in the course of the BSc Energy and Business Administration. This includes the following: Underground Blasting (Sprengtechnik unter Tage), Natural Gas Storage in Rock Caverns (Planung und Bau von Kavernenspeichern), Underground Emergency Response I + II (Brandschutz und Rettungswesen unter Tage)

Course type (1):

- (PF) Compulsory subject
- (PLN) Compulsory certificate of performance
- (WPF) Compulsory optional subject
- (WPLN) Elective certificate of performance

Course type (2):

- (V) Lecture
- (U) Exercise
- (H) Homework / Assignment / Thesis
- (S) Seminar work
- (Pra) Presentation
- (Ko) Colloquium

Type of Exam:

- (K) Written Exam
- (M) Oral Exam
- (S) Seminar work
- (A) Independent Assignment
- (bP) Marked Project
- (B) Report
- (Ko) Colloquium
- (AB) Thesis/Paper

Annex 1 b:
Model Study Plan of the Master Studies Course Mining Engineering

hpw	1st Semester	2nd Semester	3rd Semester	4th Semester	
1	Shaft Sinking 6 CP	Ventilation and Climatization - Advanced level 6 CP	Advanced Surface Mining 6 CP	Master-Thesis 21 CP	
2					
3					
4					
5	International Mining 6 CP	Underground Mining Equipment 6 CP			
6		Underground Mine Planning 6 CP			
7					
8					
9	Mineral Processing 3 CP	Advanced Rock Mechanics 6 CP	Applied Rock Mechanics 6 CP		
10					
11					
12	Seminar 3 CP				
13					
14		Advanced Mine Surveying 6 CP			
15	Geoinformation Systems (GIS) 6 CP		Elective I 3 CP	Elective III 3 CP	
16					
17	Mineral Resources 6 CP		Elective II 3 CP	Elective IV 3 CP	
18					
19	Industry Internship 6 CP	Surface and Underground Drilling 3 CP	Student Research Project 6 CP		
20					
21					
ΣCP=30		ΣCP=30	ΣCP=30	ΣCP=30	

	Mining - Underground
	Mining – Open Pit
	Geology
	Mine Surveying
	Mechanical Process Engineering
	Geomechanics