Amtliche Bekanntmachungen der TU Bergakademie Freiberg

Nr. 4, Heft 2 vom 26. März 2019

Modulhandbuch

für den

Masterstudiengang

Geomatics for Mineral Resource Management

Inhaltsverzeichnis

Abkürzungen

KA: schriftliche Klausur / written exam
MP: mündliche Prüfung / oral examination
AP: alternative Prüfungsleistung / alternative examination
PVL: Prüfungsvorleistung / prerequisite
MP/KA: mündliche oder schriftliche Prüfungsleistung (abhängig von Teilnehmerzahl) / written or oral examination (dependent on number of students)

SS, SoSe: Sommersemester / sommer semester
WS, WiSe: Wintersemester / winter semester

SX: Lehrveranstaltung in Semester X des Moduls / lecture in module semester x

SWS: Semesterwochenstunden

Data:	SUSBFR. MA. Nr. 090 / Examination number: 32307	Version: 03.08.2016	Start Year: WiSe 2016
Module Name:	**Applied Engineering Geology and Brownfield Revitalisation**		
(English):			
Responsible:	Nagel, Thomas / Prof. Dr.-Ing.		
Lecturer(s):	Tamáskovics, Nándor / Dr.		
Institute(s):	Institute of Geotechnics		
Duration:	1 Semester(s)		
Competencies:	Participants get the qualification to gain knowledge of the scientific field of engineering geology, including methods to evaluate soil and groundwater contaminated sites, learn to apply an interdisciplinary approach focussing on technique, economy, ecology and environmental law. The additional goal is to acquire the specific knowledge of a Brownfield Manager.		
Contents:	The basis of Engineering Geology: • Aims, Development • Materials and Mass Fabric • Environmental Factors Investigating the ground: • Geological materials, sediments, rock materials, fluids and gases • Description of materials, properties and their measurement • Geological masses • Maps • Recovery of samples • Field tests and measurements Ground behaviour: • Ground response to engineering and natural processes • Withdrawal of support by surface and underground excavations • Static loading of the ground • Dynamic loading of the ground • Ground reaction to changes of fluid and gas pressures Technology of disposal sites and tailings: • Geotechnical aspects related to the construction of disposal sites and tailings • site survey, investigations and characteristics • transport mechanisms of contaminants in the underground Contaminated sites - investigation assessment and reusing (Lifecycle): • Environmental legislation relevant to contaminated sites • Quality control of sampling on contaminated sites, analytics of site contaminations, reclamation process and monitoring • Assessment of water, soil and air pollution level (risk assessment) • Overview of reclamation methods and geotechnical securing measures • Safety of operation in dealing with contaminated sites		

	• Aspects and concepts of site revitalisation (innercity areas/landscaping) Cost-benefit considerations, case studies: • Comparing various remediation strategies and selecting best option Developing and assessing successful after-use scenarios: • Risk assessment, marketing studies, cost benefit analysis
Literature:	Price, D.G.: Engineering Geology, Principles and Practice, Springer-Verlag, Berlin-Heidelberg, 2009 Franzius V.; Altenbockum M.; Gerhold T. (Herausgeber): Handbuch: Altlastensanierung und Flächenmanagement, Verlag C.F. Müller TA Abfall/ Siedlungsabfall Arbeitshilfen Altlasten Sustainable Brownfield Regeneration: CABERNET Network Report Proceedings ECI Conferences „Green Brownfields“ Document server: http://daemon.ifgt.tu-freiberg.de Document server: http://penguin.ifgt.tu-freiberg.de
Types of Teaching:	S1 (WS): Lectures (4 SWS) S1 (WS): Practical Application (2 SWS)
Pre-requisites:	**Recommendations:** B.Sc. in Geosciences or Geo-Engineering; Basic Knowledge of Geosystems
Frequency:	each semester
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: MP/KA: Technology of disposal sites and tailings, Contaminated sites - investigation assessment and reusing (KA if 15 students or more) [MP minimum 30 min / KA 90 min] AP: Project report: Cost-benefit considerations, Developing and assessing successful after-use scenarios
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP/KA: Technologien bei Deponien und Tailings, Altlasten – Untersuchung, Bewertung und Wiedernutzbarmachung (KA bei 15 und mehr Teilnehmern) [MP mindestens 30 min / KA 90 min] AP: Projektarbeit: Kosten – Nutzen Betrachtungen, Entwicklung und Bewertung erfolgreicher Szenarien zur Folgenutzung
Credit Points:	6
Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP/KA: Technology of disposal sites and tailings, Contaminated sites - investigation assessment and reusing [w: 2] AP: Project report: Cost-benefit considerations, Developing and assessing successful after-use scenarios [w: 1]
Workload:	The workload is 180h. It is the result of 90h attendance and 90h self-studies. Latter includes the preparation and review of the teached materials and exam preparation.

Data:	ARSG. MA. Nr. 2013 / Examination number: -	Version: 05.12.2018	Start Year: WiSe 2019
Module Name:	**Applied Remote Sensing in Geosciences**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):	John, André / Dr.-Ing.		
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	After successful completion of the course students will be able to apply methods of remote sensing in the context of analysis of spatio-temporal processes in geosciences. This includes in particular, • the ability to choose suitable sensor technology based on knowledge about available sensors and related physical principles • processing of remote sensing data using typical software • application of multi-variate statistical methods to infer relevant information from sensor data, relevant to specific case studies • application of spatial modelling techniques for prediction of attributes at not samples location or times. integration of before mentioned aspects in an efficient work flow.		
Contents:	This module covers the introduction to and working on selected applications of remote sensing in geosciences by the means of selected case studies. Topics covered include • review of theoretical foundation of remote sensing • data acquisition techniques (terestrial , airborne, spaceborne) • spatio-temporal analysis of data • geoscientific background related to the case studies. Practical exercises will be conducted applying multi-spectral and radar data for change detection of ground properties and ground deformations. Students will conduct individual project assignments and present their results.		
Literature:	Richards and Jia, Remote Sensing Digital Image Analysis, Springer Schowengerdt, Remote Sensing: Models and Methods for Image Processing, Academic Press		
Types of Teaching:	S1 (WS): Applied Remote Sensing in Geosciences / Lectures (1 SWS) S1 (WS): Applied Remote Sensing in Geosciences / Practical Application (3 SWS)		
Pre-requisites:	**Recommendations:** Datenanalyse/Statistik, 2011-07-27 Grundlagen der Geowissenschaften für Nebenhörer, 2014-02-03 Grundlagen der Geofernerkundung, 2017-12-19		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: AP: Project assignment and presentation		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: AP: Projektaufgabe und Präsentation		
Credit Points:	6		
Grade:	The Grade is generated from the examination result(s) with the following weights (w):		

	AP: Project assignment and presentation [w: 1]
Workload:	The workload is 180h. It consists of 60h supervised lecture and practical time and 120h independent work including group work, practical, self-study and preparation for examination.

Data:	ASDAMCS. BA. Nr. 529 / Examination number: -	Version: 05.12.2018	Start Year: SoSe 2020
Module Name:	**Applied Spatial Data Analysis and Modelling - Case Study (GIS 2)**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):	Löbel, Karl-Heinz / Dr. Ing. Benndorf, Jörg / Prof. Dr.-Ing.		
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	After successful completion of the course, students are able to: • independently create solutions for complex practical problems in mining and geoengineering applying knowledge about mine surveying, mining engineering, geotechnical engineering and engineering geology, utilizing modern methods in geospatial data analysis, geo-modelling and GIS, • critically assess and interpreted results of the analysis and provide recommendations related to expected impact of mining activities during active and post-mining phase, • coordinate team work, create project plans and manage the work progress, • present results in a report and/or a presentation to a panel of independent experts, conduct auto-didactical education related to detailed handling of typical software.		
Contents:	• project work on a case study related to after mine care • supporting acquisition of georeferenced data • impact analysis on environment and safety • data base structures suited to map the problem on hand • GIS project management • interpolation, 2½- and 3D model building • geospatial data analysis • network analysis • client/server concepts • GIS and internet presentation of results in thematic maps and presentations		
Literature:	David Maguire, Michael Batty, Michael Goodchild: GIS, Spatial Analysis, and Modeling. ISBN: 1-58948-130-5; The ESRI Guide to GIS Analysis, Volume 1 - Geographic Patterns and Relationships. ISBN: 1-879102-06-4, Volume 2 - Spatial Measurements and Statistics. ISBN: 1-58948-116-X; Josef Fürst: GIS in Hydrologie und Wasserwirtschaft, ISBN 978-3-87907-413-6; Wolfgang Liebig, Jörg Schaller (Hrsg.) : ArcView GIS - GIS-Arbeitsbuch, ISBN 978-3-87907-346-7; Peter Fischer-Stabel (Hrsg.):Umweltinformationssysteme, ISBN 978-3-87907-423-5; Franz-Josef Behr: Strategisches GIS-Management - Grundlagen, Systemeinführung und Betrieb, ISBN 978-3-87907-350-4; Thomas Brinkhoff: Geodatenbanksysteme in Theorie und Praxis, ISBN 978-3-87907-433-4		
Types of Teaching:	S1 (SS): Applied Spatial Data Analysis and Modelling for After Mine Care - Case Study - Lectures / Lectures (1 SWS) S1 (SS): Applied Spatial Data Analysis and Modelling for After Mine Care - Case Study - Practical exercises / Practical Application (2 SWS)		

Pre-requisites:	**Recommendations:** Allgemeine Grundlagen im Markscheidewesen, 2018-01-11 Grundlagen der Geoinformationssysteme, 2014-06-16
Frequency:	yearly in the summer semester
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: MP*: Oral examination [30 min] AP*: Report on project * In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP*: mündliche Prüfung [30 min] AP*: Projektbericht * Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.
Credit Points:	5
Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP*: Oral examination [w: 2] AP*: Report on project [w: 3] * In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.
Workload:	The workload is 150h. It consists of 45h lectures 105h independent work including group work, practical, self-study and preparation for examination.

Data:	INTLAW1. MA. Nr. 2902 / Examination number: 61514	Version: 14.07.2016	Start Year: WiSe 2016
Module Name:	**Aspects of the International Law of Resources & Environment 1**		
(English):			
Responsible:	Jaeckel, Liv / Prof.		
Lecturer(s):	Albrecht, Maria		
Institute(s):	Professor of Public and Environmental Law		
Duration:	1 Semester(s)		
Competencies:	The purpose of the cluster is to give an introduction to the basic terms of law and to legal problems related to resources and environment. Students without a law background will be enabled to understand the characteristics of these fields as such, before turning to a range of more specific questions. After completion of the cluster, students should be able to identify the legal issues of simple cases in the fields of law and to decide on them using the established legal methods.		
Contents:	1. General Introduction to Law This part contents the basic legal terms, the introduction to the different fields of law and the interpretation of law. 2. Introduction to International and International environmental Law Problems of allocation of resources between states and internatinal environmental problems will be discussed. 3. The topics 1 and 2 will also be presented by presented by discussing cases (seminar).		
Literature:	Birnie/Boyle/Redgwell, International Law and the Environment, Oxford University Press		
Types of Teaching:	S1 (WS): Lectures (1 SWS) S1 (WS): Exercises (1 SWS)		
Pre-requisites:	**Recommendations:** No previous knowledge of law is required.		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [90 min]		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [90 min]		
Credit Points:	3		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]		
Workload:	The workload is 90h. It is the result of 30h attendance and 60h self-studies. Self-studies include assignments, preparation and wrapping up of lectures as well as preparation of examinations.		

Data:	INTLAW2. MA. Nr. 2921 / Examination number: 61516	Version: 14.07.2016	Start Year: SoSe 2017
Module Name:	**Aspects of the International Law of Resources & Environment 2**		
(English):			
Responsible:	Jaeckel, Liv / Prof.		
Lecturer(s):	Albrecht, Maria		
Institute(s):	Professor of Public and Environmental Law		
Duration:	1 Semester(s)		
Competencies:	Students with the background of Aspects of International Law of Resources & Environment 1 will be enabled to understand the characteristics of cases in International environmental law. After completion of this cluster, students should be able to identify the legal issues of cases in the fields of law discussed and to decide them using the established legal methods		
Contents:	1. The WTO and conflicts between trade and environment The WTO as the only global International organization dealing with the rules of trade between nations. Decisions of the WTO panel regarding conflicts of national environmental protection measures and free trade will be presented. 2. European Union and its Environmental Policy Students should gain a basic knowledge of the law-making process in the EU and the characteristics of different types of legal measures. 3. The topics 1 and 2 will also be presented by discussing cases (seminar).		
Literature:	Birnie/Boyle/Redgwell, International Law and the Environment, Oxford University Press		
Types of Teaching:	S1 (SS): Lectures (1 SWS) S1 (SS): Seminar (1 SWS)		
Pre-requisites:	**Recommendations:** Aspects of the International Law of Resources & Environment 1, 2016-07-14		
Frequency:	yearly in the summer semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [90 min]		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [90 min]		
Credit Points:	3		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]		
Workload:	The workload is 90h. It is the result of 30h attendance and 60h self-studies. Self-studies include assignments, preparation and wrapping up of lectures as well as preparation of examinations.		

Daten:	AUSGLR. BA. Nr. 635 / Prüfungs-Nr.: 33803	Stand: 21.12.2017	Start: SoSe 2019
Modulname:	**Ausgleichungsrechnung**		
(englisch):	Adjustment Theory		
Verantwortlich(e):	Donner, Ralf Ulrich / PD Dr.-Ing. habil.		
Dozent(en):	Donner, Ralf Ulrich / PD Dr.-Ing. habil.		
Institut(e):	Institut für Markscheidewesen und Geodäsie		
Dauer:	1 Semester		
Qualifikationsziele / Kompetenzen:	Die Studierenden erlangen Verständnis für die sachgerechte Anwendung der Fehlertheorie bei der Auswertung und für die Planung von Messeinsätzen. Sie können Vermessungskonzepte unter Genauigkeitsaspekten analysieren, grobe Fehler erkennen und wissen mit typischen systematischen Messabweichungen umzugehen. Sie können die Ausgleichungsrechnung für die optimale Auswertung überbestimmter geodätischer Messungen unter Nutzung einschlägiger Software sowie für individuelle Ingenieuraufgaben praktisch handhaben. Sie beherrschen Schätzverfahren u. Interpretation von Genauigkeitsangaben sicher. Sie können die Genauigkeit zu erwartender oder beobachteter Messungen bewerten.		

Inhalte:	• Fehlerlehre
	  ◦ Fehlerarten
	  ◦ Genauigkeitsmaße von Geodaten
	  ◦ Korrelation
	  ◦ Fehlerfortpflanzung
	• Ausgleichung direkter und vermittelnder Beobachtungen mit und ohne Bedingungen zwischen den Unbekannten
	• Ausgleichung korrelierter Beobachtungen
	• Aufstellen von Beobachtungsgleichungen und deren Linearisierung
	• Berechnung von Genauigkeitsmaßen
	• Zuverlässigkeit geodätischer Netze
	  ◦ Redundanz
	  ◦ innere und äußere Zuverlässigkeit		

Typische Fachliteratur:	Niemeier, W.: Ausgleichungsrechnung. Berlin [u.a.] Fröhlich, H.: Computerunterstützte Übungen zur Ausgleichsrechnung Reißmann, G.: Die Ausgleichungsrechnung		
Lehrformen:	S1 (SS): Vorlesung (2 SWS) S1 (SS): Übung (2 SWS)		
Voraussetzungen für die Teilnahme:	**Empfohlen:** Fähigkeit und Möglichkeit zur Erstellung einfacher Computerprogramme ist notwendig. Empfohlen wird die vorherige Teilnahme an Einführungskursen in "Mathematica".		
Turnus:	jährlich im Sommersemester		
Voraussetzungen für die Vergabe von Leistungspunkten:	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP [20 min] PVL: Belege PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.		
Leistungspunkte:	5		
Note:	Die Note ergibt sich entsprechend der Gewichtung (w) aus folgenden(r) Prüfungsleistung(en): MP [w: 1]		
Arbeitsaufwand:	Der Zeitaufwand beträgt 150h und setzt sich zusammen aus 60h Präsenzzeit und 90h Selbststudium. Letzteres umfasst die Bearbeitung der Übungsaufgaben und der Prüfungsvorbereitung.		

Daten:	BO. BA. Nr. 1009 / Prüfungs-Nr.: 33810	Stand: 12.09.2017	Start: SoSe 2019
Modulname:	**Bodenordnung**		
(englisch):	Town and Country Planning		
Verantwortlich(e):	Benndorf, Jörg / Prof. Dr.-Ing.		
Dozent(en):	Portsch, Anja / Dipl.-Ing. Verm.Ass.		
Institut(e):	Institut für Markscheidewesen und Geodäsie		
Dauer:	1 Semester		
Qualifikationsziele / Kompetenzen:	Die Studierenden kennen die Techniken der Bodenbewirtschaftung, der Bodenordnung und der Bodenbewertung, sie können diesbezügliche Aufgabenstellungen lösen, Lösungswege fachlich vertreten und gegenüber Dritten verbal oder in schriftlicher Form verteidigen.		
Inhalte:	Das Eigentum: Art 14 GG. Grundlagen der Wertermittlung (Begriffe, Gutachterausschuss, Kaufpreissammlung, u. a.), Wertermittlungsverfahren national und international, Bodenrichtwerte, Bewertung von dinglichen Rechten; Instrumente der Dorf- und Stadtentwicklung; Instrumente und Verfahren der Bodenordnung in Stadt (nach BauGB) und im ländlichen Raum (nach FlurbG), Bauordnungen und Bauvorlagen;		
Typische Fachliteratur:	BauGB, FlurbG, VwVfG, VwGO, GBR, BGB, SW-RL, WertR, NKR		
Lehrformen:	S1 (SS): Vorlesung (2 SWS) S1 (SS): Übung (1 SWS)		
Voraussetzungen für die Teilnahme:	**Obligatorisch:** Raumplanung und Liegenschaftskataster, 2017-09-12 Diese Voraussetzung gilt nicht für dem Masterstudiengang Geomatics **Empfohlen:** Vorkenntnisse öffentliches und privates Recht		
Turnus:	alle 2 Jahre im Sommersemester		
Voraussetzungen für die Vergabe von Leistungspunkten:	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP [20 min] AP: Belegarbeit		
Leistungspunkte:	4		
Note:	Die Note ergibt sich entsprechend der Gewichtung (w) aus folgenden(r) Prüfungsleistung(en): MP [w: 2] AP: Belegarbeit [w: 1]		
Arbeitsaufwand:	Der Zeitaufwand beträgt 120h und setzt sich zusammen aus 45h Präsenzzeit und 75h Selbststudium. Letzteres umfasst die Vor- und Nachbereitung der Lehrveranstaltung und die Prüfungsvorbereitung.		

Data:	MARKLAG. BA. Nr. 648 / Examination number: -	Version: 05.12.2018	Start Year: SoSe 2020
Module Name:	**Geomatics for Resource and Reserve Management**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):	Benndorf, Jörg / Prof. Dr.-Ing.		
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	After successful completion of the course, students are able to create case specific work flows and apply methods that support a safe, economical end environmental responsible exploitation of mineral deposits. The particular focus of this module is on: - exploration of the resource and geo-mechanical aspects including tectonics, - evaluation of mineral resources and reserves according international standards, - monitoring of operational accessible reserves (in-pit reserves), - grade control and reconciliation, - operational production and safety monitoring and - aspects related to optimization of mine design.		
Contents:	• methods and phases of resource exploration • resource/reserve estimation and international standards for reporting • operational production and safety monitoring • grade control and reconciliation • tectonic structures and its visualization in mine maps (folding structures and discontinuities) • geotechnical design aspects • applied operations resource for optimized mine design		
Literature:	Eisbacher, G.H.: Einführung in die Tektonik. Ferdinand Enke Verlag Stuttgart; Klassifikation von Lagerstätten. GDMB-Hefte, GDMB-Clausthal-Zellerfeld; Michaely, H., Blasgude H.G.: Rissmusteratlas- Bergmännisches Risswerk. FABERG-Normenausschuss Bergbau im DIN Deutsches Institut für Normung e.V. Domschke, W., Drexl, A., Klein, R., Scholl, A. (2015) Einführung in das Operations Research. Springer, Berlin.		
Types of Teaching:	S1 (SS): Geomatics for Resource and Reserve Management - Lectures / Lectures (2 SWS) S1 (SS): Geomatics for Resource and Reserve Management - Exercises and practical work in groups / Practical Application (2 SWS)		
Pre-requisites:	**Recommendations:** Risstechnik, CAD und Geodatenbanken, 2017-11-14		
Frequency:	yearly in the summer semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: MP [30 min] PVL: Excursion report, set of assignments incl. presentation PVL have to be satisfied before the examination.		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP [30 min] PVL: Exkursionsbericht, Hausarbeit incl. Präsentation PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.		
Credit Points:	6		

Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP [w: 1]
Workload:	The workload is 180h. It consists of 60h presence time (lectures and underground surveying practical), and 120 hours independent work including group work, practical, self-study and preparation for examination.

Data:	Geomod. MA. Nr. 638 / Examination number: -	Version: 05.12.2018	Start Year: WiSe 2019
Module Name:	**Geomodelling – Geostatistics for Natural Resource Modelling**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):			
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	After successful completion of the course, students are able to: - explain the theoretical foundation of spatial data analysis, geostatistical model building and estimation, - apply geostatistical methods in the context of estimating natural re-sources/reserves, - critically evaluate model assumptions of different estimation and simuation method and choose suitable methods for specific applications, - discuss the critical character of the SMU-size to recoverable reserves, - conduct a resource/reserve estimation in a simple case study.		
Contents:	Importance of Resource Modelling and Estimation in the Value Chain of Mining, Uni-variate and Multi-variate Explorative Data Analysis, Analysis of Spatial Continuity, the Spatial Random Function Model, Model Assumptions of Stationarity and Ergodicity, Inference of a Spatial Random Function using unbiased Estimators, Dealing with Preferential Sampling, Variography and Variogram Modeling, Simple Methods for Spatial Estimation including the Polygon Method, Triangulation, Inverse Distance Power and Polynomial Regression, Geostatistical Methods for Spatial Estimation including Simple Kriging, Ordinary Kriging and Universal Kriging, Integrating Secondary Information into Spatial Modeling using Techniques of Co-Kriging, other methods including Indicator Kriging and Block Kriging, Introduction in Modeling spatial Uncertainty using Conditional Simulation, the Method of Sequential Gaussian Simulation, Geostatistical Considerations in Estimating Reserves in Terms of Volume-Variance Relationship for defining Smallest Minable Units and Grade Tonnage Curves, Applications in Mining Cases, Introduction to CRIRSCO-based International Reporting standards (example JORC Code).		
Literature:	M. Armstrong: “Basic Linear Geostatistics”, Springer Verlag; H. Akin, H. Siemes: „Praktische Geostatistik“, Springer Verlag; A. G. Journel, and C.J. Huijbregts, 1978, Mining Geostatistics, Academic Press; P. Goovaerts: “Geostatistics for Natural Resource Evaluation“, Oxford University Press; T. Schafmeister: “Geostatistik für die hydrogeologische Praxis“, Springer Verlag		
Types of Teaching:	S1 (WS): Geomodelling – Geostatistics for natural resource modelling - Lecture / Lectures (2 SWS) S1 (WS): Geomodelling – Geostatistics for natural resource modelling - Practical work in the computer lab / Practical Application (2 SWS)		
Pre-requisites:	**Recommendations:** Angewandte Statistik, 2009-05-25 Infinitesimalrechnung, An introductory course in statistics.		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA* [90 min] AP*: Set of assignments		

	* In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA* [90 min] AP*: Hausarbeiten * Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.
Credit Points:	5
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA* [w: 2] AP*: Set of assignments [w: 1] * In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.
Workload:	The workload is 150h. It consists of 60h presence time (lectures and practical), and 90 hours independent work including group work, practical, self-study and preparation for examination.

Data:	GEOMON. BA. 128 / Examination number: -	Version: 05.12.2018	Start Year: WiSe 2019
Module Name:	**Geomonitoring**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):	Benndorf, Jörg / Prof. Dr.-Ing. John, André / Dr.-Ing.		
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	Students are able to build on their knowledge about geodetic and geotechnical measurement methods on the one hand and their understanding about the geogenic/ antropogenic process to monitor on the other hand to generate reliable and effective monitoring concepts for spatial, temporal and spatio-temporal processes. Students are able to critically analyze monitoring concepts and interpret monitoring results.		
Contents:	The lecture introduces to applications and to the methodological approach of geomonitoring. Starting on the basis of measurement and data acquisition techniques it discusses monitoring design aspects and statistical and model based inference strategies. The aim is to infer an understanding of geo-processes and their relevant spatio-temporal dynamics, including change detection. Topical application in the context of resource extraction impact- and environmental impact monitoring on different scales in time and space will be discussed and analyzed.		
Literature:	Kavanagh, B.F. (2002): Geomatics. Pearson Education, Upper Saddle River; Jain, R. (2015). Environmental Impact of Mining and Mineral Processing: Management, Monitoring, and Auditing Strategies. Butterworth-Heinemann. Fischer-Stabel, P. (2005): Umweltinformationssysteme. Wichmann, Heidelberg. de Gruijter, J., Brus, D.J., Bierkens, M.F.P., Knotters, M.(2006). Sampling for Natural Resources. Springer.		
Types of Teaching:	S1 (WS): Geomonitoring - Lecture / Lectures (2 SWS) S1 (WS): Geomonitoring - Practical exercises / Practical Application (2 SWS)		
Pre-requisites:	**Recommendations:** Geomodellierung, 2018-01-11 Grundlagen der Geoinformationssysteme, 2014-06-16 Allgemeine Grundlagen der Vermessungs- und Instrumententechnik, 2015-06-01 Ingenieurgeodäsie, 2017-09-13 Grundlagen der Geofernerkundung, 2017-12-19 Ingenieurvermessung		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: MP [30 min] PVL: Project report PVL have to be satisfied before the examination.		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP [30 min] PVL: Projektbericht		

	PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.
Credit Points:	5
Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP [w: 1]
Workload:	The workload is 150h. It consists of 60h supervised lecture and practical time and 90h independent work including group work, practical, self-study and preparation for examination.

Daten:	BGM. BA. Nr. 640 / Prüfungs-Nr.: 32404	Stand: 03.05.2016	Start: WiSe 2015
Modulname:	**Grundlagen der Bodenmechanik und Angewandte Gebirgsmechanik**		
(englisch):	Fundamentals of Soil Mechanics and Applied Rock Mechanics		
Verantwortlich(e):	Konietzky, Heinz / Prof. Dr.-Ing. habil.		
Dozent(en):	Konietzky, Heinz / Prof. Dr.-Ing. habil. Tamáskovics, Nándor / Dr.		
Institut(e):	Institut für Geotechnik		
Dauer:	1 Semester		
Qualifikationsziele / Kompetenzen:	Studierende erlangen grundlegendes Fachwissen des geotechnischen Ingenieurwesens auf dem Gebiet der Bodenmechanik und der Gebirgsmechanik. Die Studierenden werden befähigt geotechnische Sachverhalte und die in der Geotechnik angewendeten Methoden zu verstehen und zu bewerten. Weiterhin werden die Studierenden in die Lage versetzt, einfache geotechnische Sachverhalte selbst zu berechnen bzw. abzuschätzen.		
Inhalte:	Bodenmechanik Grundlagen: • Spannungszustände in Lockergesteinen • Wasserströmung in Lockergesteinen • Konsolidationstheorie • Bruchzustände in Lockergesteinen • Aktiver und passiver Erddruck • Standsicherheit von Böschungen Angewandte Gebirgsmechanik: • Kennenlernen der Grundbegriffe der Geomechanik inklusive deren mathematischen bzw. geometrischen Darstellung • Vermittlung gebirgs- und felsmechanischer Grundlagen zur Bewertung gebirgsmechanischer Erscheinungen • Verformungs- und Festigkeitseigenschaften von Gesteinen und geklüftetem Gebirge • Gebirgsklassifikationen • Sekundäre Spannungszustände für verschiedene Querschnittsformen unterirdischer Hohlräume und Ursachen für Brucherscheinungen unter der Mitwirkung von Trennflächen (Klüftung, Schichtung, Schieferung)		
Typische Fachliteratur:	Förster, W.: Bodenmechanik, Teubner Verlag, 1997; Kempfert, H.-G., Raithel, M.: Bodenmechanik und Grundbau, Bauwerk Verlag, 2009; Grundbau Taschenbuch, Teil I-III, Ernst-Sohn-Verlag, 2009; Einschlägige DIN-Normung; Jaeger J.C. et al.: Fundaments of Rock Mechanics, Blackwell Publ., 2007; Brady & Brown: Rock Mechanics for Underground Mining, Kluwer Academic Publishers, 2004; Hudson u. a.: Comprehensive Rock Engineering, Pergamon Press, Oxford, 1993 E-Book: Lehrstuhl Felsmechanik		
Lehrformen:	S1 (WS): Vorlesung (4 SWS) S1 (WS): Übung (2 SWS)		
Voraussetzungen für die Teilnahme:	**Empfohlen:** Theoretische Grundlagen der Geomechanik, 2014-03-21 Mechanische Eigenschaften der Festgesteine, 2014-03-21		

	Mechanische Eigenschaften der Lockergesteine, 2011-07-29
Turnus:	jährlich im Wintersemester
Voraussetzungen für die Vergabe von Leistungspunkten:	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA*: Bodenmechanik Grundlagen [90 min] KA*: Angewandte Gebirgsmechanik [90 min] * Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.
Leistungspunkte:	6
Note:	Die Note ergibt sich entsprechend der Gewichtung (w) aus folgenden(r) Prüfungsleistung(en): KA*: Bodenmechanik Grundlagen [w: 1] KA*: Angewandte Gebirgsmechanik [w: 1] * Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.
Arbeitsaufwand:	Der Zeitaufwand beträgt 180h und setzt sich zusammen aus 90h Präsenzzeit und 90h Selbststudium. Letzteres umfasst die Vor- und Nachbereitung der Lehrveranstaltung und die Prüfungsvorbereitung.

Data:	HRMOB. MA. Nr. 3203 / Examination number: 61008	Version: 14.02.2017	Start Year: SoSe 2011
Module Name:	**Human Resource Management and Organizational Behavior (HRMOB)**		
(English):			
Responsible:	Stumpf-Wollersheim, Jutta / Prof. Dr. rer. pol.		
Lecturer(s):	Stumpf-Wollersheim, Jutta / Prof. Dr. rer. pol.		
Institute(s):	International Management and Stategy		
Duration:	1 Semester(s)		
Competencies:	The primary objective of this course is to help you learn to diagnose management situations so that you will be able to transfer this skill to your working world. Specific objectives of the course include: 1. Understanding the relevance of human resources for organizations and the key concepts of human behavior in organizations. 2. Appreciating how the human side of management is an essential complement to the technical skills you are learning in other courses. 3. Learning concepts and approaches that will enable you to analyze HR- and organizational problems and to develop appropriate solutions. 4. Developing the knowledge and skills you need to be a successful manager of yourself and others.		
Contents:	1. Introduction 2. Organizational Behavior (OB) 2.1 Individual level (foundations of individual behavior; impacts of individual characteristics; impact of situational factors) 2.2 Group level (foundations of group behavior, understanding work teams; group processes e.g., learning in teams) 2.3 Leadership 3. Human Resource Management (HRM) 3.1 Changing Nature of HRM 3.2 HRM Planning 3.3 Human Resource Adjustments 3.4 Training and Developing HR 3.5 Compensating HR Presentations and Conclusions		
Literature:	Mathis, R.L.; Jackson, J.H.: „Human Resource Management“, South Western College Publishing: Cincinnati 2006 Judge, T.A.; Robbins, S.P.: „Organizational Behavior“, Pearson Prentice Hall: Upper Saddle River, N.J. 2016		
Types of Teaching:	S1 (SS): Lectures (2 SWS)		
Pre-requisites:	**Recommendations:** None		
Frequency:	yearly in the summer semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA: Final test [90 min]		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA: Abschlussklausur [90 min]		
Credit Points:	3		
Grade:	The Grade is generated from the examination result(s) with the following		

	weights (w): KA: Final test [w: 1]
Workload:	The workload is 90h. It is the result of 30h attendance and 60h self-studies.

Data:	InternGeom. MA. Nr. 3660 / Examination number: -	Version: 05.12.2018	Start Year: WiSe 2019
Module Name:	**Industry Internship Geomatics**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):			
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	Students will apply their gained knowledge in practical tasks during an industry internship in a geomatic-oriented enterprise, consultant company, public authority or similar institutions institution. Students will deepen their understanding of the business context of their subject, and develop cross-disciplinary and interpersonal skills.		
Contents:	The internship contains of: • 20 days practical work in a company or related institution, • regular consultations with the university supervisor, • a short and consistent internship report, • an evaluation talk with the supervisor. The organization of an internship is in the responsibility of the student. The supervisor has to agree upfront, of the organized internship is suitable for this module.		
Literature:	n.a.		
Types of Teaching:	S1: Practical work in an enterprise, consulting company, public authority or similar institution (20 days) / project		
Pre-requisites:			
Frequency:	constantly		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: AP*: Written report and evaluation discussion No grading. * In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: AP*: Praktikumsbericht und Praktikumsdiskussion Es wird keine Note vergeben. * Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.		
Credit Points:	5		
Grade:	The examination results are not rated. The credits are given when the exams are passed successfully.		
Workload:	The workload is 150h. (20 working days)		

Data:	OMIS. MA. Nr. 2903 / Examination number: 60517	Version: 06.07.2016	Start Year: WiSe 2016
Module Name:	**Information Management**		
(English):			
Responsible:	Felden, Carsten / Prof. Dr.		
Lecturer(s):	Felden, Carsten / Prof. Dr.		
Institute(s):	Institute of Information Management and Management Information Systems		
Duration:	1 Semester(s)		
Competencies:	Students get a general view to understand integration of business and technology in companies. This course provides a comprehensive and integrative understanding of essential new technologies, information system applications, and their impact on business models and managerial decision making. From a managerial perspective, the course addresses an application of concepts regarding hardware, software, and data organization. The students will understand and apply basics of information systems with a focus on economic issues as well as the significance of information systems for companies and the practical information and communication technologies to increase the efficiency and effectiveness of information systems.		
Contents:	1. Introduction: the domain of business information systems 2. Organizations and systems 3. Data, information, and knowledge 4. Information systems, and organizational infrastructure 5. Communication infrastructure 6. ICT systems infrastructure 7. The business environment 8. Electronic business, electronic commerce, and electronic government 9. Assessing the use and impact of information systems 10. Planning, strategy, and management 11. Services, projects and operations 12. Information systems development 13. Successful informatics practice		
Literature:	Beynon-Davies, P.: Business Information System, Palgrave Macmilian edition 2, London, 2013 Bocij, P.; Business Information System, Global Edition, Pearson Education LTD, Harlow, 2014 Laudon, K.; Laudon, J.: Management Information Systems, edition 14, Pearson Education, Prentice Hall, 2015.		
Types of Teaching:	Lecture / Lectures (2 SWS) Recitation / Exercises (2 SWS)		
Pre-requisites:			
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [90 min]		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [90 min]		
Credit Points:	6		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]		
Workload:	The workload is 180h. It is the result of 60h attendance and 120h self-		

	studies.

Data:	InnoProGeom. MA. Nr. 3661 / Examination number: -	Version: 05.12.2018	Start Year: WiSe 2019
Module Name:	**Innovation Project Geomatics**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):	John, André / Dr.-Ing.		
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	After successful completion of the module, students are able to: • create innovative solutions for a complex challenge in the context of geomatics for mineral resource management as result of a team effort, • apply their project management and interpersonal communication skills to achieve innovative solutions, • develop a concept for the scenario of a market entry for the created innovative solutions and • present and defend the solution in front of an expert panel.		
Contents:	A detailed challenge will be provided inspired by topics of current interest in the larger community of geomatics in mineral resource management. For the team-project, teams will be defined by the supervisor. The teams will conduct independent work supported by regularly scheduled audits, selected expert lectures and also the possibility of consulting experts. Teams have to manage their project work including tasks, schedules and team roles independently. A solution to the challenge has to be created by applying their knowledge gained in all modules taken before, extended by individual focused auto-didactical investigations. Given a scenario that the solution should be brought to the national and/or international market, a market entry plan has to be generated. The innovative solution and the market entry plan have to be presented in a consistent report and be defended in front of an expert panel assembled by the course coordinator.		
Literature:	Typical literature will be recommended by expert lecturers and/or has to be investigated independently.		
Types of Teaching:	S1 (WS): Innovation Seminar - Expert lecures, audits, consulting hours, independent group work / Seminar (2 SWS)		
Pre-requisites:	**Mandatory:** Abschluss von Modulen des Studiengangs im Umfang von mindestens 50 LP (Proof of the successful conclusion of at least 50 LPs/ECTS of mandatory, optional and free elective modules as defined in the study documents for the MSc in Geomatics for Mineral Resource Management.)		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: AP*: Report on the innovation project AP*: Oral defense of the innovation project * In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: AP*: Bericht zum Innovationsprojekt AP*: Mündliche Verteidigung zum Innovationsprojekt		

	* Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.
Credit Points:	10
Grade:	The Grade is generated from the examination result(s) with the following weights (w): AP*: Report on the innovation project [w: 2] AP*: Oral defense of the innovation project [w: 1] * In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.
Workload:	The workload is 300h. It consists of 30 hours audits, lectures and consulting hours, and 270 hours independent group work, report writing and preparation for examination.

Data:	IDEVRES. MA. Nr. 3417 / Examination number: 62005	Version: 07.02.2017	Start Year: SoSe 2013
Module Name:	**International Development and Resources**		
(English):			
Responsible:	Stephan, Johannes / Prof. Dr.		
Lecturer(s):	Stephan, Johannes / Prof. Dr.		
Institute(s):	Professor of International Resource Policy and Economic Development		
Duration:	1 Semester(s)		
Competencies:	Students will be able to understand the implications of management of firms in the environment of developing economies. Companies involved in a region that is characterised by much lower levels of economic development face particular challenges in the management: they have to consider the implications that development strategies, both national and coordinated by international organisations and NGOs, have on their activities. Of particular relevance in developing economies is the role of natural resources that are often abundant and currently their most precious source of national welfare. Students acquire the understanding that natural resources can easily turn into a curse, if they are not included into a coherent national development policy. Those include most prominently export-oriented policies, state-aid policies and the development of national champions, the attraction of foreign direct investments, and incentive systems for outward investment.		
Contents:	Part I - Economic development and emerging markets I.1 Foreign exchange and economic development I.2 Reminder of trade theory and politics I.3 Characteristics of developed, emerging, and developing countries I.4 Theories of Economic Development: Overview I.5 Development Policies: Approaches, Failures, and New Consensus? I.6 The Chinese way: infrastructure for development Part II - The role of natural resources for economic development II.1 The concept of the resource curse in general II.2 The Salter-Swan model II.3 Concepts for a benign role of resources for development (“Successful resource-based development”) II.4 The economics of export restrictions of depletable resources (example rare earth, other critical resources)		
Literature:	Todaro, M. P. (2006): Economic Development, 9th edition, Addison Wesley, New York World Bank Development Report (current years) Various recent Journal articles from e.g. “World Development”; “World Bank Economic Review”; “Journal of Development Economics”. Andersen, A. D. and B. Johnson (2014) Monocausalism versus Systems Approach to Development ' The Possibility of Natural Resource-based Development. Institutions and Economies, Vol. 6, No. 2, pp. 27-54. van den Ploeg (2011) Natural Resources: Curse or Blessing? Journal of Economic Literature 49/2, pp. 366-420.		
Types of Teaching:	S1 (SS): Lectures (2 SWS) S1 (SS): Exercises (2 SWS)		
Pre-requisites:	**Recommendations:** Makroökonomik, 2009-08-18 Mikroökonomische Theorie, 2014-03-05 Knowledge at Bachelor level in business administration is required.		
Frequency:	yearly in the summer semester		
Requirements for Credit	For the award of credit points it is necessary to pass the module exam.		

Points:	The module exam contains: KA [120 min] AP: Presentation [15 min]
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [120 min] AP: Präsentation [15 min]
Credit Points:	6
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 4] AP: Presentation [w: 1]
Workload:	The workload is 180h. It is the result of 60h attendance and 120h self-studies.

Data:	MINING. MA. Nr. 2914 / Examination number: 31703	Version: 28.04.2010	Start Year: WiSe 2010
Module Name:	**Introduction to Mining**		
(English):			
Responsible:	Drebenstedt, Carsten / Prof. Dr.		
Lecturer(s):	Drebenstedt, Carsten / Prof. Dr.		
Institute(s):	Institute of Mining and Special Civil Engineering		
Duration:	1 Semester(s)		
Competencies:	Basic knowledge in role of mining and mining engineering processes and relationship to other disciplines; Understanding of sustainable development in mining industry: balance between mining production, social development and environment protection.		
Contents:	Mining is one of the oldest and most important sectors in our civilisation building the backbone of many further industries. Developed economies highly dependent on mineral and energy imports. The world knows many wars about reserves and resources. Mining production employs million of workers worldwide and is especially in developing countries an important source of income. On other side mining has a great influence to the environment and social sphere. Mining is today a modern industry with high standard in working safety and environment protection. The largest machines the world knows are operating in open pit mines. The lecture introduces this interesting and important world of mining and gives an understanding for economic, social and technical processes. Case studies will illustrate the practical side of knowledge application.		
Literature:	Hartmann et al: SME Mining Engineering Handbook, Vol. 1 and 2, Society of Mining, Metallurgy and Exploration, Littleton, Colorado, actual edition Hustrulid, Kuchta: Open pit mine planning and design, Balkema, latest edition		
Types of Teaching:	S1 (WS): Lectures (1 SWS) S1 (WS): Exercises (1 SWS)		
Pre-requisites:	**Recommendations:** No requirements.		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [90 min]		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [90 min]		
Credit Points:	3		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]		
Workload:	The workload is 90h. It is the result of 30h attendance and 60h self-studies.		

Data:	IUFEN. BA. Nr. / Examination number: 60810	Version: 13.07.2016	Start Year: SoSe 2017
Module Name:	**Investment and Finance**		
(English):			
Responsible:	Horsch, Andreas / Prof. Dr.		
Lecturer(s):	Horsch, Andreas / Prof. Dr.		
Institute(s):	Professor of Investment and Finance		
Duration:	1 Semester(s)		
Competencies:	The module enables students to solve problems of investment and finance by applying basic analytic concepts. Students are able to recognize and distinguish relevant details of financial problems, to interpret them from a cashflow-based view and to apply appropriate tools to it. They are able to calculate fundamental economic ratios (as NPVs) and to conclude based hereupon if a particular financial option is preferable.		
Contents:	The module is concerned with basic concepts of corporate finance and corporate investments. During the first half, students study the concept, application, and drawbacks of evaluation methods like Net Present Value (NPV) and Internal Rate of Return (IRR/MIRR). Hereafter, possibilities to adjust these approaches to imperfect markets (including uncertainty, financing, taxes) are introduced. During the second half, methods of external corporate finance, i.e. equity and debt, are analyzed. Due to the relevance of the institutional framework, in particular universal principles of debt finance are discussed. Structure: 1 Liquidity vs. Profitability 2 Static Investment Analysis 3 Dynamic Investment Analysis 4 Extensions of Dynamic Approaches 5 Structuring Corporate Finance 6 Equity Finance 7 Debt Finance 8 Mezzanine Finance		
Literature:	A selection of recommended papers will be handed out as part of the set of slides. Besides, classic textbooks provide valuable insights, in particular: Brealey/Myers/Allen: Principles of Corporate Finance, 12th ed., New York (McGrawHill) 2016. Van Horne/Wachowicz: Fundamentals of Financial Management, 13th ed., Harlow et al. (Pearson) 2009.		
Types of Teaching:	S1 (SS): With Excercise Parts / Lectures (2 SWS)		
Pre-requisites:	**Recommendations:** Good command of mathematics is desirable. Attending Cost Accounting before this module is recommended.		
Frequency:	yearly in the summer semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [90 min]		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [90 min]		
Credit Points:	3		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]		
Workload:	The workload is 90h. It is the result of 30h attendance and 60h self-		

	studies.

Data:	MScGeomMRM. MA. Nr. 3662 / Examination number: -	Version: 05.12.2018	Start Year: SoSe 2020
Module Name:	**MSc Thesis Geomatics for Mineral Resource Management**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):	Benndorf, Jörg / Prof. Dr.-Ing.		
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	5 Month(s)		
Competencies:	The students will demonstrate the ability to independently solve a specific complex scientific or engineering task in the field of geomatics for mineral resource management. This includes the typical steps • definition of detailed objectives and research questions, • definition of a project plan to solve these questions, • a suitable choice and justification of methods for data acquisition, analysis or modelling, • the application to the task defined and • a critical interpretation of results. The student will be able to present the results and the scientific argumentation in a consistent MSc thesis report and presentation to their peers in form of a public MSc thesis defense.		
Contents:	Authorship and editing of a scientific publication in form of a MSc thesis report, including • task analysis and definition of goal and objectives, • design of a work plan tailored to achieve the goal and objective defined, • review of the state of the art related to the topic, • presentation and justification of methods used to achieve the goal and objectives, • conducting numerical or in-situ experiments, measurements, numerical calculations, simulations etc., • analysis and interpretation of results, • summary and • recommendations and potentially generalization of results. MSc thesis guidelines of TU Bergakademie Freiberg have to be considered for the report. The public defense will be in form of a 25 minutes' presentation followed by a detailed discussion on the topic.		
Literature:	Guideline for the preparation of scientific thesis at TU Bergakademie Freiberg from 27.06.2005, DIN 1422, part 4 (08/1985); Recommendations for task specific literature will be provided by the supervisor.		
Types of Teaching:	S1: Independent work on a scientific or engineering task / Thesis		
Pre-requisites:	**Mandatory:** Abschluss von Modulen der Vertiefung im Umfang von 80 LP, darunter alle Pflichtmodule der Vertiefung. (Proof of the successful conclusion of modules totalling 80 CP of the specialization,thereof all mandatory modules.		
Frequency:	constantly		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: AP*: MSc thesis report		

	AP*: MSc thesis colloquium * In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: AP*: Masterarbeit AP*: Kolloquium * Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.
Credit Points:	30
Grade:	The Grade is generated from the examination result(s) with the following weights (w): AP*: MSc thesis report [w: 2] AP*: MSc thesis colloquium [w: 1] * In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.
Workload:	The workload is 900h. It consists of independent investigations, consultations, thesis preparation, colloquium preparation and presentation.

Data:	OPMAN. MA. Nr. 2970 / Examination number: 61304	Version: 06.07.2015	Start Year: WiSe 2016
Module Name:	**Operations Management**		
(English):			
Responsible:	Höck, Michael / Prof. Dr.		
Lecturer(s):	Höck, Michael / Prof. Dr.		
Institute(s):	Professor of Industrial Management, Production Management and Logistics		
Duration:	1 Semester(s)		
Competencies:	Foremost, the module aims to convey to the student problem-solving competencies with a view to putting the student in a position to analyse the complex questions in operations management, to structure them, and to develop solution alternatives.		
Contents:	This course addresses the management of operations in manufacturing and service firms. Diverse activities, such as determining the size and type of production process, purchasing the appropriate raw materials, planning and scheduling the flow of materials and the nature and content of inventories, assuring product quality, and deciding on the production hardware and how it gets used, comprise this function of the company. Managing operations well requires both strategic and tactical skills. During the term, we will consider such topics as: process analysis, workforce issues, materials management, quality and productivity, technology, and strategic planning, together with relevant analytical techniques. This course will provide a survey of these issues.		
Literature:	Davis, M. & Heineke, J. (2005): Operations Management, 5/e, McGraw-Hill Cachon & Terwiesch (2006): Matching Supply and Demand, McGraw-Hill Stevenson (2007): Operations Management, 9/e, McGraw-Hill.		
Types of Teaching:	S1 (WS): Lectures (2 SWS) S1 (WS): Exercises (2 SWS)		
Pre-requisites:	**Recommendations:** None		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [90 min] PVL: Case Studies PVL have to be satisfied before the examination.		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [90 min] PVL: Fallstudien PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.		
Credit Points:	6		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]		
Workload:	The workload is 180h. It is the result of 60h attendance and 120h self-studies. Self-study consists of preparation and review of the lectures, independent work on case studies, as well as preparation for the written test.		

Data:	OREDEP. MA. Nr. 2915 / Examination number: 31201	Version: 28.04.2010	Start Year: SoSe 2011
Module Name:	**Ore Deposits & Economic Geology**		
(English):			
Responsible:	Seifert, Thomas / Prof. Dr.		
Lecturer(s):	Seifert, Thomas / Prof. Dr.		
Institute(s):	Institute of Mineralogy		
Duration:	1 Semester(s)		
Competencies:	Offering engineers and non-geoscientists the opportunity to get some background knowledge on the genesis of ore deposits and resulting implications for exploration and processing.		
Contents:	An introduction to ore-forming environments. Major case studies of ore and industrial mineral deposits will also be discussed. An integral part of the course is the study of hand specimens.		
Literature:	Evans, A. M. (1993). Ore Geology and Industrial Minerals, Oxford: Blackwell.Guilbert, J.M. and Park, C.F. (1986). The Geology of Ore Deposits, New York: Freeman.Kesler, E. (1994) Mineral Resources, Economics and the Environment, New York: Macmillan.		
Types of Teaching:	S1 (SS): Lectures (1 SWS) S1 (SS): Exercises (1 SWS)		
Pre-requisites:	**Recommendations:** No requirements.		
Frequency:	yearly in the summer semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [90 min]		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [90 min]		
Credit Points:	3		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]		
Workload:	The workload is 90h. It is the result of 30h attendance and 60h self-studies.		

Daten:	Photo. MA. Nr. 3495 / Prüfungs-Nr.: 33807	Stand: 19.12.2017	Start: WiSe 2018
Modulname:	**Photogrammetrie**		
(englisch):	Photogrammetry		
Verantwortlich(e):	Donner, Ralf Ulrich / PD Dr.-Ing. habil.		
Dozent(en):	Donner, Ralf Ulrich / PD Dr.-Ing. habil.		
Institut(e):	Institut für Markscheidewesen und Geodäsie		
Dauer:	1 Semester		
Qualifikationsziele / Kompetenzen:	Verständnis der geometrischen und der technischen Grundlagen der Gewinnung geometrischer Informationen durch flächenhafte Abtastung. Methodenkompetenz zur bildvermittelten Bestimmung geometrischer Größen und ihrer Fehlermaße mit Hilfe kalibrierter Spezialkameras und mit Amateurkameras. Fähigkeit zur Bewertung photogrammetrischer Werkzeuge und Produkte.		
Inhalte:	Geometrische Grundlagen der Erzeugung digitaler Bilder und ihre technische Realisierung in verschiedenartigen photogrammetrischen Messkameras, in Sensoren der Fernerkundung und in Amateurkameras; metrische 2D- und 3D-Auswertung; Techniken der Bildzuordnung. Der Schwerpunkt liegt im Bereich der terrestrischen Photogrammetrie unter Verwendung von Methoden aus dem Bereich Computer Vision. Erzeugen einer 3D-Punktwolke, Analyse und Bewertung ihrer Genauigkeit. Internationale Fachliteratur wird behandelt.		
Typische Fachliteratur:	Luhmann, T.: Nahbereichsphotogrammetrie. Heidelberg; Kraus, K.: Photogrammetrie. Berlin Förstner, W. & B. P. Wrobel: Photogrammetric Computer Vision. Springer 2016 Hartley, R. & Zissermann: A.: Multiple View Geometry in Computer Vision. Cambridge;		
Lehrformen:	S1 (WS): Photogrammetrie - nur im geraden Wintersemester / Vorlesung (2 SWS) S1 (WS): Photogrammetrie - nur im geraden Wintersemester / Übung (1 SWS)		
Voraussetzungen für die Teilnahme:	**Empfohlen:** Einführung in die Informatik, 2009-06-02 Höhere Mathematik für Ingenieure 1, 2009-05-27 Höhere Mathematik für Ingenieure 2, 2009-05-27 Matrizenrechnung, Vektoralgebra, Analysis, Fähigkeit und Möglichkeit zur Erstellung einfacher Computerprogramme für die Bildbearbeitung, Ausgleichungsrechnung, Grundvorstellungen projektiver Geometrie von Vorteil		
Turnus:	alle 2 Jahre im Wintersemester		
Voraussetzungen für die Vergabe von Leistungspunkten:	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP [20 bis 30 min] PVL: Belege PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.		
Leistungspunkte:	4		
Note:	Die Note ergibt sich entsprechend der Gewichtung (w) aus folgenden(r) Prüfungsleistung(en): MP [w: 1]		
Arbeitsaufwand:	Der Zeitaufwand beträgt 120h und setzt sich zusammen aus 45h Präsenzzeit und 75h Selbststudium.		

Data:	OMIS. MA. Nr. 3202 / Examination number: 62101	Version: 11.01.2017	Start Year: WiSe 2010
Module Name:	**Project Management**		
(English):			
Responsible:	Jacob, Dieter / Prof. Dr.		
Lecturer(s):	Müller, Clemens / Master		
Institute(s):	Professor of Construction Management		
Duration:	1 Semester(s)		
Competencies:	Students obtain an understanding of the concept of project management and become familiar with important tasks in relation to the management of projects.		
Contents:	This course presents the principles and techniques of managing projects, primarily engineering projects, from the owner's feasibility study through design and development to completion. It emphasises project management during the early stages of project development because it is at that point that the ability to influence the quality, cost and time of a project is at its highest. It includes project scope definition, development of work plan, planning and scheduling, procurement strategies and highlights the management of the three basic components of a project: quality/scope, budget/cost and time/schedule. A simulation exercise is included to demonstrate working in a group and highlight the importance of communication against a backdrop of determining procurement strategy.		
Literature:	• Schelle, Heinz/ Ottmann, Roland/ Pfeiffer, Astrid: Project Manager. German Association for Project Management (GPM), Member of the International Project Management Association (IPMA), 2006. • Kerzner, Harold: Project Management – A Systems Approach to Planning, Scheduling, and Controlling, associated with the Project Management Institute (PMI), 11th Ed, 2013. • The Chartered Institute of Building – Project Management for Construction and Development, 2014. • Klee, Lukas: International Construction Contract Law, 1st Ed, 2014. • Peter W.G. Morris/ George H. Hough – The Anatomy of Major Projects: A Study of the Reality of Project Management. London, 1987. • Merrow, Edward W. – Industrial Megaprojects: Concepts, Strategies, and Practices for Success. New Jersey, 2011. • Köchendörfer, Bernd; Liebchen, Jens; Viering, Markus G.: Bau-Projektmanagement: Grundlagen und Vorgehensweisen, 4th Ed, 2010. • Berner, Fritz; Kochendörfer, Bernd; Schach, Rainer: Grundlagen der Baubetriebslehre 2 – Baubetriebsplanung, 2nd Ed, 2014 • Uher, Thomas; Adam, Zantis; Zantis: Programming and Scheduling Techniques, 2nd Ed, 2011. • Vanhoucke, Mario: Project Management with Dynamic Scheduling – Baseline Scheduling, Risk Analysis and Project Control, 2nd Ed, 2013. • Jacob, Dieter; Müller, Clemens: Estimating in Heavy Construction: Roads, Bridges, Tunnels, Foundations, 1st Ed, 2016.		
Types of Teaching:	S1 (WS): Exercises (1 SWS) S1 (WS): Lectures (1 SWS)		
Pre-requisites:	**Recommendations:**		

	No pre-requisites are required.
Frequency:	yearly in the winter semester
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: KA [90 min]
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA [90 min]
Credit Points:	3
Grade:	The Grade is generated from the examination result(s) with the following weights (w): KA [w: 1]
Workload:	The workload is 90h. It is the result of 30h attendance and 60h self-studies.

Data:	BBREKL. MA. Nr. 2087 / Examination number: 31719	Version: 13.07.2014	Start Year: SoSe 2014
Module Name:	**Reclamation**		
(English):			
Responsible:	Drebenstedt, Carsten / Prof. Dr.		
Lecturer(s):	Drebenstedt, Carsten / Prof. Dr.		
Institute(s):	Institute of Mining and Special Civil Engineering		
Duration:	1 Semester(s)		
Competencies:	The module provides the development of expertise and methodological skills in the field of mining engineering. The students learn the theory and practice of reclamation in mining as essential element of balance for mining impacts. They understand the parallelism of mine and reclamation planning and the fact, why reclamation can exceed the mine project phase. Additionally the students will be qualified to explain scientifically reclamation measures, plan technical measures and calculate the financial expenses.		
Contents:	• Impacts of mining and its effects • Legal requirements for permission • Scientific fundamentals of reclamation (soil, ground water balance,...) • Concepts • Utilization requirements and realization in the post-mining landscaping (agriculture, forestry, waterbodies, nature protection, recreation, miscellaneous) • Case studies		
Literature:	Pflug (Hrsg.), 1998, Braunkohlentagebau und Rekultivierung, Springer Verlag Olschowy, Bergbau und Landschaft, 1993, Paray Verlag Gilscher, Bruns, 1999, Renaturierung von Abbaustellen, Verlag Eugen Ulmer Stuttgart		
Types of Teaching:	S1 (SS): Lectures (3 SWS) S1 (SS): Exercises (2 SWS) S1 (SS): Practical Application (1 SWS)		
Pre-requisites:	**Recommendations:** Mathemathic-scientific fundamentals		
Frequency:	yearly in the summer semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: MP/KA (KA if 21 students or more) [MP minimum 30 min / KA 60 min] PVL: Submission and positive evaluation of module exercises PVL: Participation in 2 excursions of the chair Surface-Mining PVL have to be satisfied before the examination.		
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP/KA (KA bei 21 und mehr Teilnehmern) [MP mindestens 30 min / KA 60 min] PVL: Erfolgreicher Abschluss der Übungsaufgaben PVL: 2 Fachexkursionen Tagebau PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.		
Credit Points:	6		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP/KA [w: 1]		
Workload:	The workload is 180h. It is the result of 90h attendance and 90h self-		

	studies. Self-study includes autonomous and instructed preparation and performance of follow-up course work and examination preparation.

Daten:	RISS. BA. Nr. 636 / Prüfungs-Nr.: 30110	Stand: 14.11.2017	Start: SoSe 2019
Modulname:	**Risstechnik, CAD und Geodatenbanken**		
(englisch):	Mine Mapping, CAD and Geodata Management		
Verantwortlich(e):	Benndorf, Jörg / Prof. Dr.-Ing.		
Dozent(en):	Benndorf, Jörg / Prof. Dr.-Ing.		
Institut(e):	Institut für Markscheidewesen und Geodäsie		
Dauer:	1 Semester		
Qualifikationsziele / Kompetenzen:	Die Studierenden sind nach Absolvierung des Moduls in der Lage, Karten und Risse anzufertigen und nachzutragen, Konstruktionen und Berechnungen auf der Grundlage bergmännischer Risse anzufertigen, Geodaten entsprechend den Anforderungen des Bergmännischen Risswerkes zu strukturieren sowie unter- und übertägiger Geodaten unter Nutzung einschlägiger Software zu dokumentieren und visualisieren.		
Inhalte:	Grundlagen der darstellenden Geometrie: Konstruktion von Grundriss, Aufriss und Seitenriss; Schnitte, Durchdringung ebener und gekrümmter Flächen, Grundlagen des bergmännischen Risswerkes; Gegenstand und Aufgaben des Markscheidewesens, gesetzliche Grundlagen in Bezug auf das Risswerk, Projektions- und Abbildungsarten des bergmännischen Risswerks, Form und Gestaltung nach DIN 21901-21923, Konstruktionen im bergmännischen Risswerk, Flächen, Volumen- und Massenberechnungen; Einführung in AutoCAD, Einführung in die Bearbeitung des Risswerkes mit AutoCAD, Datenbanken, Datenstrukturen angewandt auf das Bergmännisches Risswerk.		
Typische Fachliteratur:	Neubert, K.; Stein, W.: Plan- und Rißkunde Knufinke, P.: Allgemeine Vermessungs- und Markscheidekunde Michaely, H., Blasgude H.G.: Rissmusteratlas- Bergmännisches Risswerk FABERG-Normenausschuss Bergbau im DIN Deutsches Institut für Normung e.V.		
Lehrformen:	S1 (SS): Vorlesung (2 SWS) S1 (SS): Übung (2 SWS)		
Voraussetzungen für die Teilnahme:	**Empfohlen:** Benötigt werden Grundkenntnisse im Umgang mit PC		
Turnus:	jährlich im Sommersemester		
Voraussetzungen für die Vergabe von Leistungspunkten:	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP [20 min] PVL: Belege PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.		
Leistungspunkte:	5		
Note:	Die Note ergibt sich entsprechend der Gewichtung (w) aus folgenden(r) Prüfungsleistung(en): MP [w: 1]		
Arbeitsaufwand:	Der Zeitaufwand beträgt 150h und setzt sich zusammen aus 60h Präsenzzeit und 90h Selbststudium.		

Data:	BODBEWB. BA. Nr. 646 / Examination number: -	Version: 05.12.2018	Start Year: SoSe 2020
Module Name:	**Special Topics Geokinematics**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):	Benndorf, Jörg / Prof. Dr.-Ing. John, André / Dr.-Ing.		
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	After successful completion of the course, students are able to: • solve topical problems related to predicting and monitoring mining induced ground movements, • utilize methods of inverse modelling to estimate parameters of prediction models based on monitoring data and • apply methods of machine learning to analyse highly dimensional data and identify relations between independent and dependent variables.		
Contents:	• review of methods for predicting mining induced ground movements on topical examples • applied inverse modelling and geostatistics for parameter estimation in the context of ground movement prediction • introduction to supervised and unsupervised learning (Machine Learning) in the context of resource extraction monitoring and prediction • case studies of machine learning in the context of mining induced ground movement modelling and exploration • case studies for ground movement prediction and parameter estimation		
Literature:	Kratzsch, Helmut: Bergschadenkunde. 4. Aufl., 2004, 873 S., ISBN 3-00-001661-9; Whittaker, B.N., Reddish D.J.: Subsidence. -Occurrence, Prediction and Control, 1989, 528 S., ISBN 0-444-87274-4; Kanevski, M., Timonin, V., & Pozdnukhov, A. (2009). Machine learning for spatial environmental data: theory, applications, and software. EPFL press Dzegniuk, B., Fenk, J., Pielok, J. : Analyse und Prognose von Boden und Gebirgsbewegungen im Flözbergbau. 1987,105 S., ISBN 0071-9390; Journals: Markscheidewesen, Geotechnik, Mathematical Geosciences, Computer and Geosciences, Journal of Mining Sciences		
Types of Teaching:	S1 (SS): Special Topics Geokinematics - Lectures / Lectures (2 SWS) S1 (SS): Special Topics Geokinematics - Practical work in groups / Practical Application (2 SWS)		
Pre-requisites:	**Recommendations:** Höhere Mathematik für Ingenieure 1, 2015-03-12 Höhere Mathematik für Ingenieure 2, 2015-03-12 Allgemeine Grundlagen der Bergschadenlehre, 2017-01-24 Datenanalyse/Statistik, 2011-07-27 Geomodelling – Geostatistics for Natural Resource Modelling, 2018-12-05 Ausgleichungsrechnung, 2017-12-21		
Frequency:	yearly in the summer semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: MP: Oral examination [20 to 30 min] PVL: Set of assignments		

	PVL have to be satisfied before the examination.
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP: mündliche Prüfung [20 bis 30 min] PVL: Hausarbeiten PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.
Credit Points:	4
Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP: Oral examination [w: 2] PVL: Set of assignments [w: 1]
Workload:	The workload is 120h. It consists of 60h presence time (lectures and practical), and 60 hours independent work including group work, practical, self-study and preparation for examination

Daten:	IG3. MA. Nr. 2035 / Prüfungs-Nr.: -	Stand: 24.01.2019	Start: WiSe 2019
Modulname:	**Umweltingenieurgeologie**		
(englisch):	Environmental Engineering Geology		
Verantwortlich(e):	Butscher, Christoph / Prof. Dr.		
Dozent(en):	Tondera, Detlev / Dipl. - Geol. Butscher, Christoph / Prof. Dr.		
Institut(e):	Institut für Geotechnik		
Dauer:	2 Semester		
Qualifikationsziele / Kompetenzen:	Die Studierenden werden vertraut mit Themen der Umweltgeotechnik. Sie kennen die Bedeutung und Auswirkungen von Altlasten, der Deponierung von Abfällen sowie des Altbergbaus. Sie verstehen die dabei stattfindenden Prozesse und können Maßnahmen zur Verhinderung oder Abmilderung negativer Folgen für Umwelt und Mensch diskutieren und planen. Sie können Sachverhalte des Altbergbaus wissenschaftlich Präsentieren. Sie können Ergebnisse der Altlastenbearbeitung und von Standsicherheitsuntersuchungen in Gutachten darstellen und bewerten sowie Maßnahmen empfehlen.		
Inhalte:	Altlasten und Bodensanierung: Einführung in die Altlastenproblematik; rechtliche Grundlagen; Bewertung von Altlasten; altlastenrelevante Schadstoffe; Verfahren der Bodensanierung; Nachsorge; Flächenrecycling; Altlastenbearbeitung in Sachsen; Erstellung eines Altlasten-Gutachtens Deponierung von Abfällen: wissenschaftliche Grundlagen; rechtliche Rahmenbedingungen; geologisch-hydrogeologische und geotechnische Aspekte bei der Anlage und beim Betreiben von Deponien, industriellen Absetzanlagen und geologischen Tiefenlagern; computergestützte Standsicherheitsanalyse; Erstellung eines geotechnischen Gutachtens Altbergbau: rechtliche Rahmenbedingungen; Erkundungsmethoden; Methoden zur Bewertung, Sanierung und Sicherung; regionale Besonderheiten in Sachsen (Braunkohletagebau, Uranerzabbau); Wassermanagement gefluteter Bergwerke; internationale Fallbeispiele		
Typische Fachliteratur:	Blume et al. (Hrsg.) (2011): Handbuch des Bodenschutzes Suthersan et al. (2017): Remediation Engineering. CRC Press, Boca Raton LfULG (2003): Handbuch zur Altlastenbehandlung. LfULG, Dresden. Drescher (1997): Deponiebau. Ernst & Sohn, Berlin Empfehlungen des AK 4.6 “Altbergbau” der DGGT		
Lehrformen:	S1 (WS): Altlasten und Bodensanierung / Vorlesung (1 SWS) S1 (WS): Altlasten und Bodensanierung / Übung (1 SWS) S2 (SS): Deponierung von Abfällen / Vorlesung (1 SWS) S2 (SS): Deponierung von Abfällen / Übung (1 SWS) S2 (SS): Altbergbau / Vorlesung (1 SWS) S2 (SS): Altbergbau / Übung (1 SWS) Die Reihenfolge der Modulsemester ist flexibel.		
Voraussetzungen für die Teilnahme:	**Empfohlen:** Grundlagen der Ingenieurgeologie, 2018-12-20 Angewandte Ingenieurgeologie, 2018-12-20		
Turnus:	jährlich im Wintersemester		
Voraussetzungen für die Vergabe von Leistungspunkten:	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: KA*: Umweltingenieurgeologie [120 min] AP*: Belegarbeit Umweltingenieurgeologie (bestehend aus zwei Berichten und einer Präsentation)		

	* Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.
Leistungspunkte:	8
Note:	Die Note ergibt sich entsprechend der Gewichtung (w) aus folgenden(r) Prüfungsleistung(en): KA*: Umweltingenieurgeologie [w: 1] AP*: Belegarbeit Umweltingenieurgeologie (bestehend aus zwei Berichten und einer Präsentation) [w: 1] * Bei Modulen mit mehreren Prüfungsleistungen muss diese Prüfungsleistung bestanden bzw. mit mindestens "ausreichend" (4,0) bewertet sein.
Arbeitsaufwand:	Der Zeitaufwand beträgt 240h und setzt sich zusammen aus 90h Präsenzzeit und 150h Selbststudium.

Data:	MARVERM. BA. Nr. 641 / Examination number: -	Version: 05.12.2018	Start Year: WiSe 2019
Module Name:	**Underground Mine Surveying**		
(English):			
Responsible:	Benndorf, Jörg / Prof. Dr.-Ing.		
Lecturer(s):	Benndorf, Jörg / Prof. Dr.-Ing.		
Institute(s):	Institute for Mine Surveying and Geodesy		
Duration:	1 Semester(s)		
Competencies:	After successful completion of the course, students are able to: • apply the theory of error propagation in the context of planning and critical analysis of measurement results for underground surveying campaigns, • optimize the case specific use of suitable surveying instrumentation, the measurement design and data processing method for campaigns related to the absolute spatial orientation of underground mining workings, • independently conduct typically underground mine surveying tasks and analyze results.		
Contents:	• legal regulations with respect to underground mine surveying (in particular German law: "Verordnung über markscheiderische Arbeiten und Beobachtung der Oberfläche - Markscheider-Bergverordnung") • application of the theory of error propagation and GUM - Guide to the Expression of Uncertainty in Measurement for precision surveying design and evaluation of results • transfer of coordinates and directional angels from surface to underground (mechanical and optical shaft plumbing, gyroscopic measurements, application of inertial systems) • alignment control in underground drifts and tunnels • underground geodetic infrastructure and mine mapping • drill hole surveying • recent developments in underground positioning and navigation		
Literature:	Schulte, Löhr, Vosen: Markscheidekunde für das Studium und die betriebliche Praxis. Springer Verlag; Meixner, H. und Bukrinskij, A.: Markscheidewesen für Bergbaufachrichtungen. VEB Deutscher Verlag für Grundstoffindustrie, Leipzig 1985; Knufinke, P.: Allgemeine Vermessungs- und Markscheidekunde.; 1. Auflage, ISBN: 3-89653-530-7. Deutscher Markscheiderverein e.V., Bochum, 1999; Ogundare, J. O. (2015). Precision surveying: the principles and geomatics practice. John Wiley & Sons. Zeitschriften: Markscheidewesen, AVN, VDV-Magazin		
Types of Teaching:	S1 (WS): Underground Mine Surveying / Lectures (2 SWS) S1 (WS): Underground Mine Surveying - exercises and practical work in groups (3 SWS) / Practical Application (3 SWS)		
Pre-requisites:	**Mandatory:** Introduction to surveying or similar subjects **Recommendations:** Allgemeine Grundlagen der Vermessungs- und Instrumententechnik, 2015-06-01 Basic knowledge about surveying, surveying instrumentation and underground mining.		
Frequency:	yearly in the winter semester		

Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: MP [30 min] PVL: Exercises and practical work in groups PVL have to be satisfied before the examination.
	Voraussetzung für die Vergabe von Leistungspunkten ist das Bestehen der Modulprüfung. Die Modulprüfung umfasst: MP [30 min] PVL: Übungen und praktische Arbeit in Gruppen PVL müssen vor Prüfungsantritt erfüllt sein bzw. nachgewiesen werden.
Credit Points:	5
Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP [w: 1]
Workload:	The workload is 150h. It consists of 75h presence time (lectures and underground surveying practical), and 105 hours independent work including group work, practical, self-study and preparation for examination.

Freiberg, den 26. März 2019

gez.
Prof. Dr. Klaus-Dieter Barbknecht
Rektor

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