

Module Plan for M.Sc. In Geosciences curriculum at the Ruhr-Universität Bochum for the <i>Prüfungsordnung</i> 2019 Version März 2025						
	Person responsible for the Module	CP	SWS (weekly hours)	Semester	Language of instruction	Ergänzungs module (Complimentary module)
Analytical methods in Earth Sciences						
Electron beam microanalysis	Hoffmann / Jöns	6		2		
Electron beam microanalysis (Lecture)			2	SS	English	
Electron beam microanalysis (Practical exercises)			2	SS	English	
Analytical methods in rock analysis	Fockenber	5		2, 3		
Methods of rock analysis			2	SS	English	
Practicals on rock analysis			2	WS	English	
Geochemical analyses by laser ablation-ICP-mass spectrometry	Schuth	5		3		
Methods of LA-ICPMS			2	WS	English	
Practical course in LA-ICPMS			2	WS	English	
Engineering Geology and Rock Mechanics						
Grundlagen des Geingenieurwesens	Backers	6				
Grundlagen der Ingenieurgeologie			2	WS	German	
Darstellen und Analysieren geotechnischer Informationen			2	WS	German	
Rock mass stress fields	Backers / Bücken			1		
Stress field and rock mass behaviour			2	WS	English	
Stress field modelling and simulation			1	WS	English	
Rock mass mechanics and rock engineering	Duda	5		2		
Rock mass mechanics			2	SS	English	
Rock engineering			2	SS	English	
Rock mass characterisation (Baugrundcharakterisierung Fels)	Backers	5		2, 3		
Rock mass mapping			5 days	SS	Englisch/ German	
Rock mass lab			2	WS	Englisch/ German	
Baugrundcharakterisierung Boden	Backers, Eickhoff	5		2, 3		
Bodenmechanisches und hydraulisches Laborpraktikum			2	WS	German	
Lockergesteinskartierung und hydrogeologisches Feldpraktikum			5 Tage	SS	German	
Geomechanik	Backers	10		3		
Geomechanik und Geotechnik komplexer Systeme			2	WS	German	
geomechanische numerische Simulation			1	WS	German	
Geotechnisches Projekt			1	WS	German	
Engineering geological digital mapping strategies	Duda	5		1		
UAV License				WS	Englisch/ German	
Digitally supported engineering geological mapping				WS	Englisch/ German	
Digital mapping research project	Duda	5		2		
Digital mapping research project				SS	Englisch/ German	
Engineering geology colloquium				SS	Englisch/ German	
Geological engineering for subsurface energy systems	Backers	10		3		
Reservoir geomechanics			2		English	
Simulation of geological systems			1		English	
Subsurface energy utilisation project			1		English	
Grundbau- und Bodenmechanik	Backers/Registration at the Institute of Civil Engineering ***	6				
Grundbau			3	WS	German	
Bodenmechanik			3	WS	German	
Geotechnische Herausforderungen des Anthropozäns			0,5	SS	German	
Baubetrieb und Management	Backers/Registration at the Institute of Civil Engineering **	9				
Bauwirtschaft und Bauverträge				WS	German	
Projektmanagement				WS	German	
Betriebswirtschaft im Bauwesen				WS	German	

Umweltgeotechnik	Backers/Registration at the Institute of Civil Engineering **	6				
Umweltgeotechnik - Deponietechnik				SS	German	
Umgang mit Altlasten				SS	German	
Altbergbau				SS	German	
Seminar Altbergbau				SS	German	
Arbeitssicherheit I / Baustellenorganisation	Backers/Registration at the Institute of Civil Engineering **	2				
Arbeitssicherheit I / Baustellenorganisation				SS	German	
BWL für Ingenieure	Backers/Registration at the Institute of Civil Engineering ***	4				
BWL für Ingenieure				SS	German	
Boden- und Vegetationsökologie	Backers/Registration at the Institute of Geographie ****	6				
Boden- und Vegetationsökologie I:Bodenschutz				WS	German	
Boden- und Vegetationsökologie II:Vegetation				WS	German	
Crystallography						
Kristallchemie	Schreuer/ Münchhaffen	10		2, 3		
Kristallchemie			2	WS	German	E
Realstrukturbau und Phasenumwandlung			2	SS	German	
Edelsteinkunde			2	SS	German	E
Kristallisation	Schreuer/ Münchhaffen	10		2, 3		
Mineralization in geothermal systems			4	WS	English	
Synthetische Kristalle			2	SS	German	
Kristallphysik	Schreuer/ Münchhaffen	10		1, 2		
Kristallphysik			2	WS	German	E
Physikalische Charakterisierung			4	SS	German	
Festkörperspektroskopie	Fechtelkord	10		2, 3		
Festkörperspektroskopie I: NMR Spek.			2	SS	German	
Festkörperspektroskopie II: Allg. Spek.			2	WS	German	
Laborübung zu FK I			2	SS	German	
Laborübung zu FK II			2	WS	German	
Crystal structure analysis	Yusenko	10		2, 3		
Crystal structure analysis (Lectures)			2	SS	English	
Single crystal X-ray diffraction: (Practical)			3	WS	English	
Powder X-ray diffraction: (Practical)			3	WS	English	
Earthquake physics and processes						
Earthquake processes	Harrington	6				
Earthquake seismology and the seismic cycle			4		English	
Earthquakes seminar and data analysis	Harrington	9		2, 3		
Induced seismicity seminar			2	SS	English	
Fault transition zones			2	WS	English	
Seismic data and time series analyses			2	WS	English	
Seismotectonics and Seismic Hazard	Harrington / Verdecchia	6		SS		
Seismotectonic and Seismic Hazard			4	SS	English	
Geology and geohazards in an active subduction zone	Harrington	5		SS		
Geology and geohazards in an active subduction zone			3		English	
Geomorphology and Geohazards						
Geomorphology and geohazards	Kranz	10		2,3		
Earth surface processes and environmental change			2	SS	English	
Geohazards: types, causes and strategies			2	WS	English	
Field course on geomorphology and geohazards			2 days+2 block course	WS	English	
Quaternary geochronology	Kranz	5		2		
Quaternary geochronology			2	SS	English	
				SS	English	

Geothermal energy						
Geothermal Drilling Engineering and Subsurface Technologies	Reinsch (Lehrtransfer IEG)*	5		3, 4		
Geothermal Drilling Engineering and Subsurface Technologies			5	WS	English	
Geothermal energy systems	Reinsch (Lehrtransfer IEG)*	5				
Geothermal energy systems			5	SS	English	
(Experimental) Geophysics and seismology						
Applied geophysics I (in this form for the last time in WS 24/25)	Friederich	10		1, 3		
Geophysical inverse problems			3	WS	English	
Seismic and electromagnetic field methods			3	WS	English	E
Applied geophysics II	Renner	10		2		
Reservoir geophysics			3	SS	English	E
Rock physics			3	SS	English	E
Geophysical methods (in this form for the last time in WS 24/25)	Friederich / Renner	14		1, 3		
Field practical			6 days field 4 data analysis	WS	English	
Scientific programming			3	1 WS	English	E
Geophysical seminar			4	3 WS	English	
Geophysical practical	Friederich/Renner Bedford/Harrington	5		1, 2, 3		
Geophysical practical				WS, SS	English	
Physics of the solid Earth I (in this form for the last time in SS 23)	Friederich	10		2		
Seismologic data analysis			3	SS	English	E
Seismic waves: theory and numerical modelling			3	SS	English	
Physics of the solid Earth II	Renner	10		1, 3		
Continuum mechanics			3	WS	English	E
Physic of earth materials			3	WS	English	E
Hydrogeology and Environmental Geology						
Applied geothermal energy	Reinsch / Renner	8		1, 2		
Shallow geothermal energy			2	WS	English	E
Deep geothermal energy			3	SS	English	E
Groundwater hydraulics	Heinze	12		1		
Introduction to groundwater hydraulics			4	WS	English	E
Hydraulic groundwater modelling			4	WS	English	
Field course in applied geology	Schreuer	6		annual		
Field course in applied geology (Europe, South America)		14 days annually			English	
Hydrogeological field methods	Heinze	12		2		last time offered in SS 2025
Hydrogeological field excercises			9 days	SS	English	
Analysis of measurement results			2	SS	English	
Hydrogeochemical methods I	Hachenberg	6		1		
Isotope hydrogeochemistry (lecture)			2	WS	English	
Isotope hydrogeochemistry (exercise)			2	WS	English	
Hydrogeochemical methods II	Hachenberg	9		3		
Environmental forensics and tracer development			2	WS	English	E
Hydrogeochemical modelling			4	WS	English	E
Environmental sciences (ab WS 25/26)	Hachenberg	6		2		
Climate change and water resources			2		English	E
Toxic trace elements in groundwater			2		English	
Hydrochemistry	Licha	12		1		
Inorganic hydrochemistry			4	WS	English	
Organic hydrochemistry			4	WS	English	
Scientific project in Hydrogeochemistry/Hydrogeology	Warner, Heinze	10		2		last time offered in SS 2025
Scientific soft skills			2	SS	English	
Project work			1	SS	English	

Instrumental environmental analysis	Warner	6		3		
Basics in Instrumental Environmental Analysis (Lecture)			2	WS	English	
Environmental Sampling and Analysis (Lab Course)			2	WS	English	
Siedlungswasserwirtschaft	Licha/Registration at the Institute of Civil Engineering	5		2		
Siedlungswasserwirtschaft			3	SS	German	
Physical Geodesy						
Measuring Earth surface motions with InSAR and GNSS	Bedford, Peña	6		SS		
Measuring Earth surface motions with InSAR and GNSS			4		English	
Petrology and Geochemistry						
Analytic methods in rock analysis	Fockenberg	5		2, 3		
Methods of rock analysis			2	SS	English	
Practicals on rock analysis			2	WS	English	
Igneous petrology	Chakraborty	10		1		
Petrology of igneous rocks			2	WS	English	
Thin section exercises with igneous rocks			2	WS	English	
Numerical exercises with data from igneous rocks			2	WS	English	
Kinetics	Chakraborty	10		3		
Principles of chemical kinetics			2	WS	English	
Diffusion chronometry			2	WS	English	
Kinetic modelling			2	WS	English	
Metamorphic petrology	Dohmen / Dziggel	12		2		
Petrology of metamorphic rocks			2	SS	English	
Thin section exercises with metamorphic rocks			2	SS	English	
Numerical exercises with data from metamorphic rocks			2	SS	English	
THERMOCALC course			1	SS	English	
Thermodynamics	Chakraborty	10		2		
Principles of elementary thermodynamics			4	SS	English	
Solution phase thermodynamics			2	SS	English	
High-temperature geochemistry	Fonseca	10				
High-temperature geochemistry			3	SS	English	
Practical			3	SS	English	
Mantle petrology	Beyer	5		3, 4		
Petrology of the deep Earth			2	WS	English	
Experimental Petrology: The Earth in the laboratory			3	SS	English	E
Sedimentology						
Sedimentary geochemistry	Riechelmann	10		1, 3		
Isotope geochemistry Principles and applications			4	WS	German/English	E
Laboratory course: Isotope geochemistry			4	WS	German/English	E
Tectonics and Resources						
Field course in tectonics and resources	Dziggel, Hueck	10		2, 3		
Pre-field course seminar			1	SS	English	
Field course			10 days		English	
Economic geology II	Dziggel, Hueck	10		1, 2		
Metallic mineral deposits			2	WS	English	
Non-metallic mineral deposits			1	WS	English	
Research project on ore deposits			3	SS	English	
Economic geology I	Podlaha	10		1, 2		
Petroleum geology I			2	WS	English	
Petroleum geology II			2	SS	English	
Field trip			1 day	SS	English	
Structural geology	Pascal	10		1, 2		
Lectures, seminars, exercises in structural geology			2	WS	English	E
Special methods in structural geology			2	WS	English	E
Structural geology field camp			8 days	SS	English	E

Courses for the Complementary module (15 CP)						
Anwendung der NMR-Spektroskopie in der mineralogischen und geowissenschaftlichen Forschung	Fechtelkord	3	3	SS	German	E
Angewandte Karbonatdiagenese	Müller	3	3	WS	German	E
Climate change and water resources	Hachenberg	3	2	WS	English	E
Continuum mechanics	Renner	5	3	WS	English	E
Deep geothermal energy	Renner	5	3	SS	English	E
Digital rock physics	Saenger (Hochschule Bochum)	6	4	SS	English	E
Edelsteinkunde	Schreuer/Münchhalfen	3	2	SS	German	E
Environmental forensics and tracer development	Licha	3	2	WS	English	E
Evaporite und deren Nutzung	Gillhaus	2	2	WS	German	E
Exkursion Argentinien	Wohnlich/Schreuer	6	12 Tage	WS	English	E
Field course structural geology	Pascal	3	8 days	SS	English	E
Geländeübungen in wechselnden Gebieten	Schreuer	8	8 Tage	SS	German	E
Introduction to Groundwater hydraulic	Heinze	6	4	WS	German	E
Hauptseminar Kristallographie	Schreuer	2	2	WS	English	E
Hydrogeochemical modelling	Hachenberg	6	4	WS	English	E
Induced seismicity seminar	Harrington	3	2	SS	English	E
Informatik I	ET/IT-Fak	5		WS	German	E
Informatik II	ET/IT-Fak	5		SS	German	E
Introduction to Matlab (Summer 2025)	Harrington	6	4	SS	English	E
Experimental Petrology: The Earth in the laboratory	Beyer	3	3	SS	English	E
Lectures, seminar, excercises in structural geology	Pascal	4	2	WS	English	E
Marine Geophysik	Lehrauftrag	3		WS	German	E
Mathematische Methoden der Physik I	Physik-Fak	4		WS	German	E
Mathematische Methoden der Physik II	Physik-Fak	4		SS	German	E
Physic of earth materials	Renner	5	3	WS alternating	English	E
Praxistage Felsbau	Duda	1	1	WS	German	E
Reservoir geophysics	Renner	5	3	SS	English	E
Rock physics	Renner	5	3	WS	English	E
Scientific programming	Friederich	5	3	1 WS	English	E
Seismic and electromagnetic field methods	Friederich	5	5	WS	English	E
Seismologic data analysis	Fischer	5	3	SS	English	E
Isotope geochemistry Principles and applications	Riechelmann	6	4	WS	German/English	E
Laboratory course: Isotope geochemistry	Riechelmann	4	4	WS	German/English	E
Shallow geothermal energy	Wohnlich	3	2	WS	English	E
Special methods in structural geology	Pascal	3	2	WS	English	E
Anwendungen der NMR-Spektroskopie in der mineralogischen und geowissenschaftlichen Forschung (short course)	Fechtelkord	3	3	SS	German	E
Tektonophysik	Renner	3	2	WS	German	E
Underground storage	Gillhaus	2	2	SS	English	E
Wasser zu Wein	Heimgartner/Warner Fak. Philologie	10	2	WS/SS	German	E
Well logging rudiments	Reinsch	2	2	SS	English	E
Master Thesis		30		4		

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