Modulplan for
M.Sc. In Geosciences curriculum
at the Ruhr-Universität Bochum
for the *Prüfungsordnung* 2019

Version Oktober 2021

Name of Module	Person responsible for the Module	CP	SWS	Semester	Language	Ergänzungs module (Complimentary module)
Applied geophysics I	**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	**Friederich / Renner**	**14**		**1**		
Field practical	Friederich/Renner			WS	English	
Scientiffic programming	Friederich		3	1 WS	English	**E**
Geophysical seminar	Fischer		4	3 WS	English	
Geophysical practical	**Friederich / Renner**	**5**		**1, 2, 3**		
Geophysical practical				WS, SS	English	
Physic of the solid Earth I	**Friederich**	**10**		**2**		
Seismologic data analysis			3	SS	English	**E**
Seismic waves: theory and numerical modelling			3	SS	English	
Physic of the solid Earth II	**Renner**	**10**		**1, 3**		
Continuum mechanics			3	WS	English	
Physic of earth materials			3	WS	English	**E**
Applied hydrogeology	**Wohnlich**	**9**		**2, 3**		
Fissured rock hydrogeology			2	SS	German	
Climate change and water resources			2	WS	German	**E**
Well construction			2	WS	German	
Applied geothermal energy	**Wohnlich**	**8**		**1, 2**		
Shallow geothermal energy			2	WS	English	**E**
Deep geothermal energy			3	SS	English	
Groundwater hydraulics	**Heinze**	**12**		**1**		
Groundwater hydraulics			4	WS	English	**E**
Hydraulic groundwater modelling			4	WS	English	

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Hydrochemistry	**Licha**	**12**		**1**		
Inorganic hydrochemistry			4	WS	English	
Organic hydrochemistry			4	WS	English	
Hydrogeochemical methods I	**Hachenberg**	**6**		**1**		
Isotope hydrogeochemistry (lecture)			2	WS	English	
Isotope hydrogeochemistry (exercise)			2	WS	English	**E**
Hydrogeochemical methods II	**Hachenberg**	**9**		**3**		
Environmental forensics and tracer development			2	WS	English	
Hydrogeochemical modelling			4	WS	English	**E**
Instrumental environmental analysis	**Warner**	**6**		**1,2,3,4**		
Basics in Instrumental Environmental Analysis (Lecture)			2	WS	English	
Environmental Sampling and Analysis (Lab Course)			2	WS	English	
Drilling engineering I - Geotechnical and near-surfache drilling	**Wohnlich (Lehrtransfer GZB)**	**5**		**3, 4**		
Drilling I			5	WS, SS	English	
Exercises in drilling I				WS, SS	English	
Field course in applied geology	**Wohnlich**	**7**		**annual**		
Field course in applied geology (Europe, South America)		14 Tage jährlich			English	
Hydrogeological field methods	**Wohnlich, Schiffer**	**12**		**2, 3**		
Tracer techniques in hydrogeology			3	SS	English	
Hydrogeological field camp			3	SS	English	**E**
3x 1 day field trips			2	SS	English	**E**
Siedlungswasserwirtschaft	**Wohnlich (Lehrtransfer Bauing.)**	**5**		**2**		
Siedlungswasserwirtschaft			3	SS	German	
Earthquake processes	**Harrington**	**6**		**1**		
Earthquake seismology and the seismic cycle			4	WS	English	
Earthquake seminar and data analysis	**Harrington**	**9**		**1, 2, 3, 4**		
Induced seismicity seminar			2	SS	English	**E**
Fault transition zones			2	WS	English	
Seismic data and time series analyses			2	WS	English	
Reservoir and fault geomechanics	**Harrington / Backers**	**6**		**2**		
Hydrogeomechanics			4	SS	English	**E**

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Mapping active faults	**Harrington / Verdeccia**	**6**		**2**		
Mapping active faults			4	SS	English	
Seismotonic and seismic hazard	**Harrington / Verdeccia**	**6**		**2**		
Seismotectonic and seismic hazard			4	WS	English	
Grundlagen des Geoingenieurwesens	**Backers**	**6**				
Grundlagen der Ingenieurgeologie			2	WS	German	
Darstellen und Analysieren geotechnischer Informationen			2	WS	German	
Rock mass and stress field	**Backers / Duda**	**6**				
Stress field and rock mass behaivour behaviour			2	WS	English	**E**
Stress field modelling and simulation			1	WS	English	
Geological engineering research project			2	WS	English	
Geologie im Geoingenieurwesen	**Backers**	**6**		**1, 2**		
Regionalgeologische Aspekte der Ingenieurgeologie			1	SS	German	
Ingenieurgeologische Kartierung			5	WS	German	
Geotechnische Herausforderungen des Anthropozäns			0,5	WS	German	
Felsmechanik und Felsbau	**Duda**	**6**		**2**		
Felsmechanik			1,5	SS	German	
Felsbau			1,5	SS	German	
Geomechanische numerische Simulation			1	SS	German	
Baugrunderkundung- und dokumentation	**Backers**	**5**		**2**		
Baugrunderkundung- und modellierug			2	SS	German	
Messtechnik			1	SS	German	
Baugrundcharakterisierung Fels	**Backers**	**5**		**2, 3**		
Felsmechanisches Laborpraktikum			5	WS	German	**E**
Felskartierung			2	SS	German	
Baugrundcharakterisierung Boden	**Backers**	**5**		**2, 3**		
Bodenmechanisches und hydraulisches Laborpraktikum			2	WS	German	**E**
Lockergesteinskartierung und hydrogeologisches Feldpraktikum			5	SS	German	
Grundbau- und Bodenmechanik	**Backers (Lehrtransfer Bauing.)**	**6**				
Grundbau- und Bodenmechanik			6	SS	German	
Geomechanik	**Backers**	**10**		**3**		
Geomechanik und Geotechnik komplexer Systeme			2	WS	German	
Geotechnisches Projekt			1	WS	German	

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Geologie des Pleisto-, Holo- und Anthropozäns	**Backers**	**5**		**1**		
Quartärgeologie			2	WS	German	
Georisiken			1	WS	German	
Baubetrieb und Management	**Backers (Lehrtransfer Bauing.)**	**9**				
Bauwirtschaft und Bauverträge				WS	German	
Projektmanagement				WS	German	
Betriebswirtschaft im Bauwesen				WS	German	
Umweltgeotechnik	**Backers (Lehrtransfer Bauing.)**	**6**				
Umweltgeotechnik - Deponietechnik				SS	German	
Umgang mit Altlasten				SS	German	
Altbergbau				SS	German	
Seminar Altbergbau				SS	German	
Arbeitssicherheit I / Baustellenorganisation	**Backers (Lehrtransfer Bauing.)**	**2**				
Arbeitssicherheit I / Baustellenorganisation				SS	German	
Boden- und Vegetationsökologie	**Backers (Lehrtransfer Geogr. Institut)**	**6**				
Boden- und Vegetationsökologie I:Bodenschutz				WS	German	
Boden- und Vegetationsökologie II:Vegetation				WS	German	
BWL für Ingenieure	**Backers (Lehrtransfer Bauing.)**	**4**				
BWL für Ingenieure				SS	German	
Kristallchemie	**Marler**	**10**		**2, 3**		
Kristallchemie			3	WS	English	
Realstrukturbau und Phasenumwandlung			3	SS	English	
Synthese und Kristallisation	**Schreuer**	**10**		**2, 3**		
Kristallisation			2	WS	English	
Synthese und Kristallzüchtung			4	SS	English	
Kristallphysik	**Schreuer**	**10**		**1, 2**		
Kristallphysik			3	WS	English	
Physikalische Charakterisierung			4	SS	English	

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Festkörperspektroskopie	**Fechtelkord**	**10**		**2, 3**		
Festkörperspektroskopie I: NMR Spek.			2	SS	English	
Festkörperspektroskopie II: Allg. Spek.			2	WS	English	
Laborübung zu FK I			2	SS	English	
Laborübung zu FK II			2	WS	English	
Strukturbestimmung	**Marler**	**10**		**2, 3**		
Strukturbestimmung			3	SS	English	
Röntgenbeugung			4	WS	English	
Analytic methods in rock analysis	**Fockenberg**	**5**		**2, 3**		
Methods of rock analysis			2	SS	English	
Practicals on rock analysis			2	WS	English	
Electron beam microanalysis	**Hoffmann / Jöns**	**6**		**2**		
Electron beam microanalysis (Lecture)			2	SS	English	
Electron beam microanalysis (Practical exercises)			2	SS	English	
Field course in petrology	**Chakraborty**	**6**		**3**		
Field trip			10 days	WS	English	
Analysis of results and preparation of report			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	**Schertl / Jöns / 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	

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Mantle petrology	**Beyer**	**10**		**2**		
Lecture + Paper seminar - Petrology of the deep Earth				WS	English	
Lab course +Lecture – Experimental Petrology: The Earth in the laboratory				SS	English	
Hig-temperature geochemistry	**Fonseca**	**10**				
Hig-temperature geochemistry			3	SS	English	
Practical			3	SS	English	
Field course in tectonics and resources	**Dziggel, Volante**	**10**		**2, 3**		
Pre-field course seminar			1	SS	English	
Field course			10 days		English	
Economic geology II	**Dziggel**	**10**		**1, 2**		
Metallic mineral deposits			2	WS	English	
Non-metallic mineral deposits			1	WS	English	
Research project on ore deposits			3	SS	English	
Geochemical analyses by laser ablation-ICP-mass spectrometry	**Schuth**	**5**		**2, 3**		
Methods of LA-ICPMS			2	SS/WS	English	
Practical course in LA-ICPMS			2	SS/WS	English	
Multi-disciplinary approaches to investigate poly-deformed terrains	**Volante**	**6**		**3**		
Petrological and structural analysis				WS	English	
Petrochronology and phase equilibria modelling				WS	English	**E**
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	
Advanced Sedimentology	**Immenhauser**	**10**		**1, 2**		
Sedimentary systems I			3	WS	English	
Sedimentary systems II			4	SS	English	
Biomineralization			3	WS, jedes 2. Jahr	English	**E**
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**
Basics of stable isotope geochemistry			4	WS	English	**E**

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Sedimentäre Geologie im Gelände	**Immenhauser Schreuer**	**8**				
Geländeübungen in wechselnden Gebieten			10 Tage		German	
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 T	SS	English	**E**
Geology and geohazards in an active subduction zone	**Harrington**	**5**		**SS**		
Geology and geohazards in an active subduction zone			3		English	
Courses for the Complementary module		**15**				
Groundwaterhydraulic	Wohnlich	6	4	WS	English	**E**
Umweltforensik	Licha	2	2	SS	German	**E**
Hydrogeochemical modelling	Hachenberg	6	4	WS	English	**E**
Hydrogeological field camp	Wohnlich, Schiffer	3	3	SS	English	**E**
3x 1 day field trips	Wohnlich, Schiffer	3	2	SS	English	**E**
Shallow geothermal energy	Wohnlich	2	2	WS	English	**E**
Climate change and water resources	Bender	2	2	WS	German	**E**
Induced seismicity seminar	Harrington	3	2	SS	English	**E**
Hydrogeomechanics	Harrington	6	4	SS	English	**E**
Field practical geophysics	Harrington			WS	German	**E**
Sedimentary systems I	Immenhauser	3	3	WS	English	**E**
Sedimentary systems II	Immenhauser	4	4	SS	English	**E**
Scientific writing	Immenhauser	2		SS	English	**E**
Angewandte Karbonatdiagenese	Müller	3	3	WS	German	**E**
Underground storage	Gillhaus	2	2	SS	English	**E**
Evaporite und deren Nutzung	Gillhaus	2	2	WS	German	**E**
Reservoir geophysics	Renner	5	3	SS	English	**E**
Rock physics	Renner	5	3	WS	English	**E**
Physic of earth materials	Renner	5	3	WS alternating	English	**E**
Tektonophysik	Renner	3		WS	German	**E**
Well loggin rudiments I	Renner / Rübel	2	2	WS	English	**E**
Well loggin rudiments II, analysis interpretation	Renner / Rübel	2	2	WS	English	**E**
Digital rock physics	Saenger (Hochschule Bochum)	6	4	SS	English	**E**

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Seismologic data analysis	Fischer	5	3	SS	English	**E**
Seismic and electromagnetic field methods	Friederich	5	5	WS	English	**E**
Scientiffic programming	Friederich	5	3	1 WS	English	**E**
Fortgeschrittenenpraktikum	Friederich/Renner	5			German	**E**
Log analysis	Lehrauftrag	3		SS	English	**E**
Marine Geophysik	Lehrauftrag	3		WS	German	**E**
Informatik I	ET/IT-Fak	5		WS	German	**E**
Informatik II	ET/IT-Fak	5		SS	German	**E**
Mathematische Methoden der Physik I	Physik-Fak	4		WS	German	**E**
Mathematische Methoden der Physik II	Physik-Fak	4		SS	German	**E**
Field course structural geology	Pascal	3	8 days	SS	English	**E**
Special methods in structural geology	Pascal	3		WS	English	**E**
Lectures, seminar, excercises in structural geology	Pascal	4		WS	English	**E**
Stress field and rock mass behaivour	Backers	3	2	WS	English	**E**
Einführung in die Sprengtechnik	Hellmann	2	1	WS	German	**E**
Einführung in den Bau von Schächten	Sniehotta	3	2	WS	German	**E**
Quartärgeologie	Backers	3	2	WS	German	**E**
Georisiken	Backers	2	1	WS	German	**E**
RMR Driven Design	Alber/Backers	2		WS	English	**E**
Praxistage Felsbau	Duda	1	1	WS	German	**E**
Geochemical analysis by laser ablation - ICP-Mass Spectrometry	Schuth	5	4	SS/WS	English	**E**
Petrochronology and phase equilibria modelling	Volante	3	3	WS	English	**E**
Geowissenschaftliche Materialanalyse	Marler	5	3	SS	German	**E**
Exkursion Argentinien	Wohnlich/Schreuer	5	12 Tage	WS	German	**E**
Geländeübungen in wechselnden Gebieten	Immenhauser Schreuer	8	10 Tage	SS	German	**E**
Exkursion Breitscheider Großhöhle	Richter	1		WS	German	**E**
Sedimentpetrographie (mit 2 Tagesexkursionen)	Richter	4	3	WS	German	**E**
Spezielle Petrologie der Magmatite und Metamorphite	Schertl	4	2	WS	German	**E**
Master Thesis		**30**		**4**		