

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

Version September 2022

Name of Module	Person responsible for the Module	CP	SWS	Semester	Language	Ergänzungs module (Complimentary module)
<b>Applied geophysics I</b>	<b>Friederich</b>	<b>10</b>		<b>1, 3</b>		
Geophysical inverse problems			3	WS	English	
Seismic and electromagnetic field methods			3	WS	English	<b>E</b>
<b>Applied geophysics II</b>	<b>Renner</b>	<b>10</b>		<b>2</b>		
Reservoir geophysics			3	SS	English	<b>E</b>
Rock physics			3	SS	English	<b>E</b>
<b>Geophysical methods</b>	<b>Friederich / Renner</b>	<b>14</b>		<b>1, 3</b>		
Field practical			6 days field 4 data analysis	WS	English	
Scientific programming			3	1 WS	English	<b>E</b>
Geophysical seminar			4	3 WS	English	
<b>Geophysical practical</b>	<b>Friederich / Renner</b>	<b>5</b>		<b>1, 2, 3</b>		
Geophysical practical				WS, SS	English	
<b>Physic of the solid Earth I</b>	<b>Friederich</b>	<b>10</b>		<b>2</b>		
Seismologic data analysis			3	SS	English	<b>E</b>
Seismic waves: theory and numerical modelling			3	SS	English	
<b>Physic of the solid Earth II</b>	<b>Renner</b>	<b>10</b>		<b>1, 3</b>		
Continuum mechanics			3	WS	English	
Physic of earth materials			3	WS	English	<b>E</b>
<b>Applied hydrogeology</b>	<b>Wohnlich</b>	<b>9</b>		<b>2, 3</b>		
Fissured rock hydrogeology			2	SS	German	
Climate change and water resources			2	WS	German	<b>E</b>
Well construction			2	WS	German	
<b>Applied geothermal energy</b>	<b>Wohnlich</b>	<b>8</b>		<b>1, 2</b>		
Shallow geothermal energy			2	WS	English	<b>E</b>
Deep geothermal energy			3	SS	English	
<b>Groundwater hydraulics</b>	<b>Heinze</b>	<b>12</b>		<b>1</b>		
Groundwater hydraulics			4	WS	English	<b>E</b>
Hydraulic groundwater modelling			4	WS	English	

<b>Hydrochemistry</b>	<b>Licha</b>	<b>12</b>		<b>1</b>		
Inorganic hydrochemistry			4	WS	English	
Organic hydrochemistry			4	WS	English	
<b>Hydrogeochemical methods I</b>	<b>Hachenberg</b>	<b>6</b>		<b>1</b>		
Isotope hydrogeochemistry (lecture)			2	WS	English	
Isotope hydrogeochemistry (exercise)			2	WS	English	<b>E</b>
<b>Hydrogeochemical methods II</b>	<b>Hachenberg</b>	<b>9</b>		<b>3</b>		
Environmental forensics and tracer development			2	WS	English	
Hydrogeochemical modelling			4	WS	English	
<b>Scientific project in Hydrogeochemistry/Hydrogeology</b>	<b>Warner, Heinze</b>	<b>10</b>		<b>2</b>		
Scientific soft skills			2	SS	English	
Project work			1	SS	English	
<b>Instrumental environmental analysis</b>	<b>Warner</b>	<b>6</b>		<b>1,2,3,4</b>		
Basics in Instrumental Environmental Analysis (Lecture)			2	WS	English	
Environmental Sampling and Analysis (Lab Course)			2	WS	English	
<b>Drilling engineering I - Geotechnical and near-surface drilling</b>	<b>Wohnlich (Lehrtransfer GZB)</b>	<b>5</b>		<b>3, 4</b>		
Drilling I			5	WS, SS	English	
Exercises in drilling I				WS, SS	English	
<b>Field course in applied geology</b>	<b>Wohnlich</b>	<b>7</b>		<b>annual</b>		
Field course in applied geology (Europe, South America)			14 days annually		English	
<b>Hydrogeological field methods</b>	<b>Wohnlich, Schiffer</b>	<b>12</b>		<b>2</b>		
Tracer techniques in hydrogeology			3	SS	English	
Hydrogeological field camp			3	SS	English	<b>E</b>
3x 1 day field trips			2	SS	English	<b>E</b>
<b>Siedlungswasserwirtschaft</b>	<b>Wohnlich (Lehrtransfer Bauing.)</b>	<b>5</b>		<b>2</b>		
Siedlungswasserwirtschaft			3	SS	German	
<b>Earthquake processes</b>	<b>Harrington</b>	<b>6</b>		<b>1</b>		
Earthquake seismology and the seismic cycle			4	WS	English	
<b>Earthquake seminar and data analysis</b>	<b>Harrington</b>	<b>9</b>		<b>1, 2, 3, 4</b>		
Induced seismicity seminar			2	SS	English	<b>E</b>
Fault transition zones			2	WS	English	
Seismic data and time series analyses			2	WS	English	
<b>Reservoir and fault geomechanics</b>	<b>Harrington</b>	<b>6</b>		<b>2</b>		
Hydrogeomechanics			4	SS	English	<b>E</b>

<b>Mapping active faults</b>	<b>Harrington / Verdecchia</b>	<b>6</b>		<b>2</b>		
Mapping active faults			4	SS	English	
<b>Seismotectonics and Seismic Hazard</b>	<b>Harrington / Verdecchia</b>	<b>6</b>		<b>1</b>		
Seismotectonic and Seismic Hazard			4	WS	English	
<b>Grundlagen des Geoingenieurwesens</b>	<b>Backers</b>	<b>6</b>				
Grundlagen der Ingenieurgeologie			2	WS	German	
Darstellen und Analysieren geotechnischer Informationen			2	WS	German	
<b>Rock mass and stress field</b>	<b>Backers / Duda</b>	<b>6</b>		<b>1</b>		
Stress field and rock mass behaviour behaviour			2	WS	English	<b>E</b>
Stress field modelling and simulation			1	WS	English	
Geological engineering research project			2	WS	English	
<b>Geologie im Geoingenieurwesen</b>	<b>Backers</b>	<b>6</b>		<b>1, 2</b>		
Regionalgeologie, Geoingenieurwesen und Georisikien			1,5	SS	German	
Ingenieurgeologische Kartierung			5 Tage	WS	German	
Geotechnische Herausforderungen des Anthropozäns			0,5	SS	German	
<b>Felsmechanik und Felsbau</b>	<b>Duda</b>	<b>6</b>		<b>2</b>		
Felsmechanik			1,5	SS	German	
Felsbau			1,5	SS	German	
Geomechanische numerische Simulation			1	SS	German	
<b>Baugrunderkundung und -dokumentation</b>	<b>Backers</b>	<b>5</b>		<b>2</b>		
Baugrunderkundung und -modellierung			2	SS	German	
Messtechnik			1	SS	German	
<b>Baugrundcharakterisierung Fels</b>	<b>Backers</b>	<b>5</b>		<b>2, 3</b>		
Felsmechanisches Laborpraktikum			5 Tage	WS	German	
Felskartierung			2	SS	German	
<b>Baugrundcharakterisierung Boden</b>	<b>Backers</b>	<b>5</b>		<b>2, 3</b>		
Bodenmechanisches und hydraulisches Laborpraktikum			2	WS	German	
Lockergesteinskartierung und hydrogeologisches Feldpraktikum			5 Tage	SS	German	
<b>Grundbau- und Bodenmechanik</b>	<b>Backers (Lehrtransfer Bauing.)</b>	<b>6</b>				
Grundbau- und Bodenmechanik			6	SS	German	
<b>Geomechanik</b>	<b>Backers</b>	<b>10</b>		<b>3</b>		
Geomechanik und Geotechnik komplexer Systeme			2	WS	German	
Geotechnisches Projekt			1	WS	German	
<b>Geologie des Pleisto-, Holo- und Anthropozäns</b>	<b>Backers</b>	<b>5</b>		<b>1</b>		
Quartärgeologie			2	WS	German	
Geländeübung Quartärgeologie			2 Tage	WS	German	

<b>Baubetrieb und Management</b>	<b>Backers (Lehrtransfer Bauing.)</b>	<b>9</b>				
Bauwirtschaft und Bauverträge				WS	German	
Projektmanagement				WS	German	
Betriebswirtschaft im Bauwesen				WS	German	
<b>Umweltgeotechnik</b>	<b>Backers (Lehrtransfer Bauing.)</b>	<b>6</b>				
Umweltgeotechnik - Deponietechnik				SS	German	
Umgang mit Altlasten				SS	German	
Altbergbau				SS	German	
Seminar Altbergbau				SS	German	
<b>Arbeitssicherheit I / Baustellenorganisation</b>	<b>Backers (Lehrtransfer Bauing.)</b>	<b>2</b>				
Arbeitssicherheit I / Baustellenorganisation				SS	German	
<b>Boden- und Vegetationsökologie</b>	<b>Backers (Lehrtransfer Geogr. Institut)</b>	<b>6</b>				
Boden- und Vegetationsökologie I: Bodenschutz				WS	German	
Boden- und Vegetationsökologie II: Vegetation				WS	German	
<b>BWL für Ingenieure</b>	<b>Backers (Lehrtransfer Bauing.)</b>	<b>4</b>				
BWL für Ingenieure				SS	German	
<b>Kristallisation</b>	<b>Schreuer/ Münchhalfen</b>	<b>10</b>		<b>2, 3</b>		
Mineralization in geothermal systems			4	WS	English	
Synthetische Kristalle			2	SS	German	
<b>Kristallphysik</b>	<b>Schreuer/ Münchhalfen</b>	<b>10</b>		<b>1, 2</b>		
Kristallphysik			2	WS	German	E
Physikalische Charakterisierung			4	SS	German	
<b>Kristallchemie</b>	<b>Schreuer/ Münchhalfen</b>	<b>10</b>		<b>2, 3</b>		
Kristallchemie			2	WS	German	E
Realstrukturbau und Phasenumwandlung			2	SS	German	
Edelsteinkunde			2	SS	German	E
<b>Festkörperspektroskopie</b>	<b>Fechtelkord</b>	<b>10</b>		<b>2, 3</b>		
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	
<b>Strukturbestimmung</b>	<b>NN</b>	<b>10</b>		<b>2, 3</b>		
Strukturbestimmung			2	SS	German	
Röntgenbeugung Einkristalldiffraktometrie			3	WS	German	
Röntgenbeugung Pulverdiffraktometrie			3	WS	German	

<b>Analytic methods in rock analysis</b>	<b>Fockenber</b>	<b>5</b>		<b>2, 3</b>	
Methods of rock analysis			2	SS	English
Practicals on rock analysis			2	WS	English
<b>Electron beam microanalysis</b>	<b>Hoffmann / Jöns</b>	<b>6</b>		<b>2</b>	
Electron beam microanalysis (Lecture)			2	SS	English
Electron beam microanalysis (Practical exercises)			2	SS	English
<b>Field course in petrology</b>	<b>Chakraborty</b>	<b>6</b>		<b>3</b>	
Field trip			10 days	WS	English
Analysis of results and preparation of report			2	WS	English
<b>Igneous petrology</b>	<b>Chakraborty</b>	<b>10</b>		<b>1</b>	
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
<b>Kinetics</b>	<b>Chakraborty</b>	<b>10</b>		<b>3</b>	
Principles of chemical kinetics			2	WS	English
Diffusion chronometry			2	WS	English
Kinetic modelling			2	WS	English
<b>Metamorphic petrology</b>	<b>Schertl / Jöns / Dziggel</b>	<b>12</b>		<b>2</b>	
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
<b>Thermodynamics</b>	<b>Chakraborty</b>	<b>10</b>		<b>2</b>	
Principles of elementary thermodynamics			4	SS	English
Solution phase thermodynamics			2	SS	English
<b>Mantle petrology</b>	<b>Beyer</b>	<b>10</b>		<b>3, 4</b>	
Lecture + Paper seminar - Petrology of the deep Earth			3	WS	English
Lab course + Lecture – Experimental Petrology: The Earth in the laboratory			5	SS	English
<b>Hig-temperature geochemistry</b>	<b>Fonseca</b>	<b>10</b>			
Hig-temperature geochemistry			3	SS	English
Practical			3	SS	English
<b>Field course in tectonics and resources</b>	<b>Dziggel, Volante</b>	<b>10</b>		<b>2, 3</b>	
Pre-field course seminar			1	SS	English
Field course			10 days		English

<b>Economic geology II</b>	<b>Dziggel</b>	<b>10</b>		<b>1, 2</b>		
Metallic mineral deposits			2	WS	English	
Non-metallic mineral deposits			1	WS	English	
Research project on ore deposits			3	SS	English	
<b>Geochemical analyses by laser ablation-ICP-mass spectrometry</b>	<b>Schuth</b>	<b>5</b>		<b>2, 4</b>		
Methods of LA-ICPMS			2	WS	English	
Practical course in LA-ICPMS			2	WS	English	
<b>Multi-disciplinary approaches to investigate poly-deformed terrains</b>	<b>Volante</b>	<b>6</b>		<b>3</b>		
Petrological and structural analysis			2	WS	English	
Petrochronology and phase equilibria modelling			2	WS	English	<b>E</b>
<b>Economic geology I</b>	<b>Podlaha</b>	<b>10</b>		<b>1, 2</b>		
Petroleum geology I			2	WS	English	
Petroleum geology II			2	SS	English	
Field trip			1 day	SS	English	
<b>Advanced Sedimentology</b>	<b>Immenhauser</b>	<b>10</b>		<b>1, 2</b>		
Sedimentary systems I			3	WS	English	
Sedimentary systems II			4	SS	English	
Biomineralization			3	WS, every 2nd year	English	<b>E</b>
<b>Sedimentary geochemistry</b>	<b>Riechelmann</b>	<b>10</b>		<b>1, 3</b>		
Isotope geochemistry Principles and applications			4	WS	German/ English	
Laboratory course: Isotope geochemistry			4	WS	German/ English	
Basics of stable isotope geochemistry			4	WS	English	
<b>Sedimentäre Geologie im Gelände</b>	<b>Immenhauser Schreuer</b>	<b>8</b>				
Geländeübungen in wechselnden Gebieten			10 Tage		German	
<b>Structural geology</b>	<b>Pascal</b>	<b>10</b>		<b>1, 2</b>		
Lectures, seminars, exercises in structural geology			2	WS	English	<b>E</b>
Special methods in structural geology			2	WS	English	<b>E</b>
Structural geology field camp			8 T	SS	English	<b>E</b>
<b>Geology and geohazards in an active subduction zone</b>	<b>Harrington</b>	<b>5</b>		<b>SS</b>		
Geology and geohazards in an active subduction zone			3		English	
<b>Courses for the Complementary module</b>		<b>15</b>				
3D geological modelling: concepts and applications	Christiansen	2	2	SS	English	<b>E</b>
3x 1 day field trips	Wohnlich/Schiffer	3	2	SS	English	<b>E</b>
Angewandte Karbonatdiagenese	Müller	3	3	WS	German	<b>E</b>
Climate change and water resources	Bender	2	2	WS	German	<b>E</b>
Digital rock physics	Saenger (Hochschule Bochum)	6	4	SS	English	<b>E</b>

Edelsteinkunde	Schreuer/ Münchhallen	3	2	SS	Deutsch	E
Einführung in den Bau von Schächten	Sniehotta	3	2	WS	German	E
Evaporite und deren Nutzung	Gillhaus	2	2	WS	German	E
Exkursion Argentinien	Wohnlich/Schreuer	7	12 Tage	WS	German	E
Field course structural geology	Pascal	3	8 days	SS	English	E
Geländeübungen in wechselnden Gebieten	Immenhauser/ Schreuer	8	8 Tage	SS	German	E
Groundwaterhydraulic	Wohnlich	6	4	WS	English	E
Hauptseminar Kristallographie	Schreuer	2	2	WS	German	E
Hydrogeochemical modelling	Hachenberg	6	4	WS	English	E
Hydrogeological field camp	Wohnlich/Schiffer	3	3	SS	English	E
Hydrogeomechanics	Harrington	6	4	SS	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
Lectures, seminar, excercises in structural geology	Pascal	4		WS	English	E
Log analysis	Lehrauftrag	3		SS	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
Petrochronology and phase equilibria modelling	Volante	3	3	WS	English	E
Philosophy meets Geology	Banning/Göcke Fakultät katholische Theologie	3	2	WS	English	E
Physic of earth materials	Renner	5	3	WS alternating	English	E
Praxistage Felsbau	Duda	1	1	WS	German	E
Professional career opportunities in water sciences	Warner	3	3	WS	English	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
Scientific writing	Immenhauser	2		SS	English	E
Sedimentary systems I	Immenhauser	3	3	WS	English	E
Sedimentary systems II	Immenhauser	4	4	SS	English	E
Seismic and electromagnetic field methods	Friederich	5	5	WS	English	E
Seismologic data analysis	Fischer	5	3	SS	English	E
Shallow geothermal energy	Wohnlich	2	2	WS	English	E
Special methods in structural geology	Pascal	3		WS	English	E
Spezielle Petrologie der Magmatite und Metamorphite	Schertl	4	2	WS	German	E
Stress field and rock mass behaviour	Backers	3	2	WS	English	E

Tektonophysik	Renner	3		WS	German	E
Umweltforensik	Licha	2	2	SS	German	E
Underground storage	Gillhaus	2	2	SS	English	E
Well logging rudiments I	Renner/Rübel	2	2	WS	English	E
Well logging rudiments II, analysis interpretation	Renner/Rübel	2	2	WS	English	E
<b>Master Thesis</b>		<b>30</b>		<b>4</b>		