

Module catalog: First Major Applied Geology (AG)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
AG-V1: Foundation engineering and statistics	Methods of engineering geology I	1	1			5	2,5				TP: Exam 60 Min.	1
	Data evaluation, statistics, modelling and exercises		1		1		2,5					
AG-V2: Advanced engineering geology and hydrogeology	Hydrochemistry				2	5	5				TP: Exam 60 Min.	1
	Advanced engineering geology	2			1							
AG-E1: Groundwater modelling	Groundwater modelling		2		2	5	5				TP: Report (max. 10 pages)	1
AG-V3a: Engineering-geological calculations*	Engineering-geological calculations				2	5		2,5			TP: Exam 60 Min.	1
	Methods of engineering geology II	1	1					2,5				
AG-V3b: Environmental Hydrogeology*	Tracers, Isotopes & Natural Attenuation		4				5				TP: Exam 60 Min.	1
AG-E2a: Work in applied geology**	Engineering-geological exercises and evaluations		4			5		5			TP: Report (max. 10 pages)	1
AG-E2b: Work in applied geology**	Hydrogeological exercises and evaluations		2		2			5			TP: Report (max. 10 pages) with 30 Min. presentation	1
AG-V4a: Karsthydrogeology*	Karst and Hydrogeology		2		2	5		5			TP: Report (10-15 pages)	1
AG-V4b: Measurement technology*	Hydrogeological sharding, measurement & evaluation		2		2			5			TP: Report (10-15 pages)	1
AG-F1: Methods of applied geology	Methods of applied geology				4	5			5		TP: Exam 60 Min.	1
AG-F2a: AS-F3 Energy resources***	Geo-Energy resources		1		1	5			2,5		TP: Exam 90 Min.	1
	Geothermal energy / development and usage		1		1				2,5			
AG-F2b: PG-F1: Petrology IV ***	Analytical methods of petrology		3	1					5		TP: Exam 60 Min.	1
AG-F2c: AS-F2 Sedimentary Geochemistry***	Geochemical Proxies in Palaeoenvironmental Analysis	2							2,5		TP: Exam 60 Min.	1
	Geochemical Proxies in Palaeoenvironmental Analysis- lab	1	1						2,5			
AG-F3a: Geohazards or modelling with seminar applied geology *	Geohazards and mass movement	1			1	5			2,5		TP: Exam 60 Min.	1
	Seminars of applied geology				2				2,5			
AG-F3b: Geohazards or modelling with seminar applied geology*	Modelling	1	2						2,5		TP: Report (15-20 pages)	1
	Seminars of applied geology				2				2,5			
		4-9	10-27	0-1	14-25	45	15	15	15	0		
		Total SWS: 37										

*The students have to choose either path a or path b.

**The students have to choose one of the additional modules.

***The students have to choose one of the three modules.

Module catalog: Second Major Applied Geology (AG)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
AG-V1: Foundation engineering and statistics	Methods of engineering geology I	1	1			5	2,5				TP: Exam 60 Min.	1
	Data evaluation, statistics, modelling and exercises		1		1		2,5					
AG-V2: Advanced engineering geology and hydrogeology	Hydrochemistry				2	5	2,5				TP: Exam 60 Min.	1
	Advanced engineering geology	2			1		2,5					
AG-V3a: Engineering-geological calculations*	Engineering-geological calculations				2	5		2,5			TP: Exam 60 Min.	1
	Methods of engineering geology II	1	1					2,5				
AG-V3b: Environmental Hydrogeology*	Tracers, Isotopes & Natural Attenuation		4					5			TP: Exam 60 Min.	1
AG-V4a: Karsthydrogeology*	Karst and Hydrogeology		2		2	5		5			TP: Report (10-15 pages)	1
AG-V4b: Measurement technology*	Hydrogeological sharding, measurement & evaluation		2		2			5				TP: Report (10-15 paged)
AG-F1: Methods of applied geology	Methods of applied geology				4	5			5		TP: Exam 60 Min.	1
AG-F2a: AS-F3 Energy resources**	Geo-Energy resources		1		1	5			2,5		TP: Exam 90 Min.	1
	Geothermal energy / developement and usage		1		1				2,5			
AG-F2b: PG-F1: Petrology IV **	Analytical methods of petrology		3	1					5		TP: Exam 60 Min.	1
AG-F2c: AS-F2 Sedimentary geochemistry**	Geochemical proxies in palaeoenvironmental analysis	2				5			2,5		TP: Exam 60 Min.	1
	Geochemical proxies in palaeoenvironmental analysis - lab	1	1						2,5			
		4-7	6-13	0-1	12-14	30	10	10	10	0		
Total SWS: 29-30												

* The students have to choose either path **a** or path **b**.

** The students have to choose one of the three modules.

Module catalog: First Major Applied Mineralogy (AM)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
AM-V1: Crystal chemistry and Phase theory	Crystal chemistry		1		1	5	2				TP: Colloquium 15 Min.	1
	Phase theory (two and multi component systems)	1	1				3					
AM-V2: Powder diffractometry	Powder diffractometry		2		2	5	5				TP: Exam 60 Min.	1
AM-E1: Material and methods	Mineralogical methods		1		1	5	3				TP: Exam 60 Min.	1
	High-performance ceramics				2		2					
AM-V3: Microprobe analytics	High-temperature-synthesis	1	1			5		2			TP: Colloquium 15 Min.	1
	Microprobe analytics	1	2					3				
AM-V4: Rietveld	Rietveld course		2		2	5		5			TP: Colloquium 15 Min.	1
AM-E2: Cementing material	Cement mineralogy	1			2	5		3			TP: Colloquium 20 Min.	1
	Seminar applied mineralogy				2			2				
AM-F1: Special ceramics and monocrystals	Special ceramics and monocrystals (synthesis, characterisation and properties)		4		1	5			5		TP: Term paper (max. 30 pages)	1
AM-F2: BioMat	Calciumaluminat a. -phosphate (synthesis, characterisation, hydration and in-situ studies)		4		1	5			5		TP: Presentation (max. 30 slides, 30 Min.)	1
AM-F3: Cement	Portland cement (synthesis a. characterisation, hydratation a. in-situ characterisation)		4		1	5			5		TP: Term paper (max. 30 pages)	1
		4	22	0	15	45	15	15	15	0		
		Total SWS: 41										

Module catalog: Second Major Applied Mineralogy (AM)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
AM-V1: Crystal chemistry and Phase theory	Crystal chemistry		1		1	5	2				TP: Colloquium 15 Min.	1
	Phase theory (two and multi component systems)	1	1				3					
AM-V2: Powder diffractometry	Powder diffractometry		2		2	5	5				TP: Exam 60 Min.	1
AM-V3: Microprobe analytics	High-temperature-synthesis	1	1			5		2			TP: Colloquium 15 Min.	1
	Microprobe analytics	1	2					3				
AM-V4: Rietveld	Rietveld course		2		2	5		5			TP: Colloquium 15 Min.	1
AM-F1: Special ceramics and monocrystals	Special ceramics and monocrystals (synthesis, characterisation and properties)		4		1	5			5		TP: Term paper (max. 30 pages)	1
AM-F2: BioMat	Calciumaluminat a. -phosphate (synthesis, characterisation, hydratation and in-situ studies)		4		1	5			5		TP: Presentation (max. 30 slides, 30 Min.)	1
		3	17	0	7	30	10	10	10	0		
		Total SWS: 27										

Module catalog: First Major Sedimentology (AS)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
AS-V1: Basin- and drilling analytics	Methods of basin analytics		1		1	5	2,5				TP: Exam 60 Min.	1
	Drilling + wellbore geophysics		1		1		2,5					
AS-V2: Structural geology - Tectonics	Fault systems		1		1	5	2,5				TP: Exam 60 Min. SL: Report (max. 10 pages)	1
	Structural geology and micro tectonics				2		2,5					
AS-E1a: PG-V2 Metallic raw materials*	Economic geology		1		2	5	3				TP: Exam 60 Min.	1
	Ore microscopy		1		1		2					
AS-E1b: PB-E1 Microfacies analysis and diagenesis of carbonate rocks*	Microfacies analysis and diagenesis of carbonate rocks	1	3				5				TP: Written exam (Klausur) 90 Min.	1
AS-V3: Sedimentary petrography-diagenesis-petrophysics	Sedimentary petrography + diagenesis		1		1	5		2,5			TP: Exam 90 Min.	1
	Petrophysics + Reservoir petrology				1			1				
	Analytical methods		1		1			1,5				
AS-V4: Geophysics	Field exercise Geophysics		3			5		2,5			TP: Dyadic term paper (max. 20 pages)	1
	Seismic Interpretation I (2D)		1		1			2,5				
AS-E2a: PG-E2 Field exercise, economic geology and structures**	Field exercise economic geology		2,5			5		2,5			TP: Term paper (max. 20 pages)	1
	Field exercise structural geology		2,5					2,5				
AS-E2b:PB-V4 Palaeobiology II**	Laboratory methods in palaeontology		2			5		2,5			TP: Term paper (max. 10 pages)	1
	Biofacies and Palaeoecology		2					2,5				
AS-F1: Seismic reservoir interpretation	Seismic interpretation II (3D)		1		1	5			2,5		TP: Exam 60 Min. SL: Report (max. 10 pages)	1
	Seismic- and sequence stratigraphy		1		1				2,5			
AS-F2: Sedimentary geochemistry	Geochemical Proxies in Palaeoenvironmental Analysis	2				5			2,5		TP: Exam 60 Min.	1
	Geochemical Proxies in Palaeoenvironmental Analysis - lab	1	1						2,5			
AS-F3: Energie ressources	Geo-Energie ressources		1		1	5			2,5		TP: Exam 90 Min.	1
	Geothermal energy: developement & usage		1		1				2,5			
		3-4	20-22	0	13-16	45	15	15	15	0		
		Total SWS: 38-39										

* The students have to choose one of the additional modules.

** The students have to choose one of the additional modules.

Module catalog: Second Major Sedimentology (AS)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
AS-V1: Basin- and drilling analytics	Methods of basin analytics		1		1	5	2,5				TP: Exam 60 Min.	1
	Drilling + wellbore geophysics		1		1		2,5					
AS-V2: Structural geology - Tectonics	Fault systems		1		1	5	2,5				TP: Exam 60 Min. SL: Report (max. 10 pages)	1
	Structural geology and micro tectonics				2		2,5					
AS-V3: Sedimentary petrography-diagenesis-petrophysics	Sedimentary petrography + diagenesis		1		1	5		2,5			TP: Exam 90 Min.	1
	Petrophysics + Reservoir petrology				1			1				
	Analytical methods		1		1			1,5				
AS-V4: Geophysics	Field exercise Geophysics		3			5		2,5			TP: Dyadic term paper (max. 20 pages)	1
	Seismic Interpretation I (2D)		1		1			2,5				
AS-F1: Seismic reservoir interpretation	Seismic interpretation II (3D)		1		1	5			2,5		TP: Exam 60 Min. SL: Report (max. 10 pages)	1
	Seismic- and sequence stratigraphy		1		1				2,5			
AS-F2: Sedimentary geochemistry	Geochemical Proxies in Palaeoenvironmental Analysis	2				5			2,5		TP: Exam 60 Min.	1
	Geochemical Proxies in Palaeoenvironmental Analysis - lab	1	1						2,5			
		3	12	0	11	30	10	10	10	0		
		Total SWS: 26										

Module catalog: First Major Petrology-Geodynamics-Georesources (PG)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
PG-V1: Petrology I	Magmatism and plate tectonics	2				5	2,5				TP: Exam 60 Min.	1
	Petrology of metamorphic rocks	2					2,5					
PG-V2: Metallic raw materials	Economic geology		1		2	5	2,5				TP: Exam 60 Min.	1
	Ore microscopy		1		1		2,5					
PG-E1a: AS-V2: Structural geology – Tectonics*	Fault systems		1		1	5	2,5				TP: Exam 60 Min. SL: Report (max. 10 pages)	1
	Structural geology and micro tectonics				2		2,5					
PG-E1b: AG-V2: Advanced engineering geology and hydrogeology*	Hydrochemistry				2	5	2,5				TP: Exam 60 Min.	1
	Advanced engineering geology	2			1		2,5					
PG-V3: Petrology II	Magmatic Rocks		2			5		2,5			TP: Exam 90 Min.	1
	Metamorphic Rocks		2					2,5				
PG-V4: Petrology III	Phase petrology and thermodynamics		3			5		3			TP: Exam 90 Min.	1
	Isotopic geochemistry		2					2				
PG-E2a: Field exercise, economic geology and structures**	Field exercise economic geology		2,5			5		2,5			TP: Report (max. 20 pages)	1
	Field exercise structural geology		2,5					2,5				
PG-E2b: AG-V3b Environmental Hydrogeology**	Tracers, Isotopes & Natural Attenuation		4					5			TP: Exam 60 Min.	1
PG-F1: Petrology IV	Analytical Methods of Petrology		3	1		5			5		TP: Exam 60 Min.	1
PG-F2: Geodynamics and Volcanism	Volcanism	2				5			2,5		TP: Presentation 45 Min.	1
	Chemical Geodynamics				2				2,5			
PG-F3a: Methods of Petrology***	Petrological Methods		2	2		5			5		TP: Exam 60 Min.	1
PG-F3b: AS-F3 Energy resources***	Geo-Energy resources		1		1				2,5			TP: Exam 90 Min.
	Geothermal Energy: development and usage		1		1			2,5				
PG-F3c: AG-F3a: Geohazards or modelling with seminar applied geology *	Geohazards and mass movement	1			1	5			2,5		TP: Exam 60 Min.	1
	Seminars of applied geology *				2				2,5			
PG-F3d: AG-F1 Methods of applied geology***	Methods of applied geology				4			5			TP: Exam 60 Min.	1
		6-9	18-22	1-3	7-11	45	15	15	15	0		
		Total SWS: 37-39										

* The students have to choose one of the additional modules.

**The students have to choose one of the additional modules.

***The students have to choose one of the four modules.

Module catalog: Second Major Petrology-Geodynamics-Georesources (PG)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
PG-V1: Petrology I	Magmatism and plate tectonics	2				5	2,5				TP: Exam 60 Min.	1
	Petrology of metamorphic rocks	2					2,5					
PG-V2: Metallic raw materials	Economic geology		1		2	5	2,5				TP: Exam 60 Min.	1
	Ore microscopy		1		1		2,5					
PG-V3: Petrology II	Magmatic Rocks		2			5		2,5			TP: Exam 90 Min.	1
	Metamorphic Rocks		2					2,5				
PG-V4: Petrology III	Phase petrology and thermodynamics		3			5		3			TP: Exam 90 Min.	1
	Isotopic geochemistry		2					2				
PG-F1: Petrology IV	Analytical Methods of Petrology		3	1		5			5		TP: Exam 60 Min.	1
PG-F2: Geodynamics and Volcanism	Volcanism	2				5			2,5		TP: Presentation 45 Min.	1
	Chemical Geodynamics				2				2,5			
		6	14	1	4	30	10	10	10	0		
		Total SWS: 25										

Module catalog: First Major Palaeobiology – Palaeoenvironments (PB)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
PB-V1: Consolidation of basics I	Morphology, Systematics and Ecology of Invertebrates	1	3			5	5				TP: WE ¹ 60 Min.	1
PB-V2: Consolidation of basics II	Systematics, Ecology and Biostratigraphy of Microfossils	1	1			5	3				TP: WE ¹ 60 Min.	1
	Methods of Biostratigraphy				1		2					
PB-E1: Microfacies analysis and diagenesis of carbonate rocks	Microfacies analysis and diagenesis of carbonate rocks	1	3			5	5				TP: WE ¹ 90 Min.	1
PB-V3: Palaeobiology I	Macroevolution				2	5		3			TP: WE ¹ 60 Min.	1
	Introduction to Phylogenetic Analysis		1					2				
PB-V4: Palaeobiology II	Laboratory methods in palaeontology		2			5		2,5			TP: Assignment (max. 10 pages)	1
	Biofacies and Palaeoecology		2					2,5				
PB-E2: Analytical Palaeobiology	Analytical Palaeobiology		4			5		5			TP: Presentation 20 Min	1
PB-F1: Palaeontological Research I	Proxies in palaeoenvironmental reconstructions	1			1	5			2,5		TP: WE ¹ 60 Min.	1
	Macroecology	1	1						2,5			
PB-F2: Palaeontological Research II	Geobiology of reefs				2	5			2,5		TP: Presentation 20 Min.	1
	Programming and statistics in palaeobiology		2						2,5			
PB-F3: Palaeontological Research III	Hypothesis testing in palaeobiology				2	5			2,5		TP: WE ¹ 30 Min.	1
	Oceanography	1							2,5			
		6	19	0	8	45	15	15	15	0		
		Total SWS: 33										

1 WE = Written Exam.

Module catalog: Second Major Palaeobiology – Palaeoenvironments (PB)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
PB-V1: Consolidation of basics I	Morphology, Systematics and Ecology of Invertebrates	1	3			5	5				TP: WE ¹ 60 Min.	1
PB-V2: Consolidation of basics II	Systematics, Ecology and Biostratigraphy of Microfossils	1	1			5	3				TP: WE ¹ 60 Min.	1
	Methods of Biostratigraphy				1		2					
PB-V3: Palaeobiology I	Macroevolution				2	5		3			TP: WE ¹ 60 Min.	1
	Introduction to Phylogenetic Analysis		1					2				
PB-V4: Palaeobiology II	Laboratory methods in palaeontology		2			5		2,5			TP: Assignment (max. 10 pages)	1
	Biofacies and Palaeoecology		2					2,5				
PB-F1: Palaeontological Research I	Proxies in palaeoenvironmental reconstructions	1			1	5			2,5		TP: WE ¹ 60 Min.	1
	Macroecology	1	1						2,5			
PB-F2: Palaeontological Research II	Geobiology of reefs				2	5			2,5		TP: Presentation 20 Min.	1
	Programming and statistics in palaeobiology		2						2,5			
		4	12	0	6	30	10	10	10	0		
		Total SWS: 22										

¹ WE = Written Exam.

Module catalog: Second Major Earth Systems Research Lab (RL)

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
RL-V1: Earth Systems Research Lab I	Research Project Design		2		2	5	5				TP: Project Proposal (max. 15 pages)	1
RL-V2: Methods in Earth System Sciences I: Computing and Data Analysis in Geosciences	Computing and Data Analysis in Geosciences		4			5	5				TP: Practical exercises	0
RL-V3: Earth Systems Research Lab II	Literature Seminar				2	5		2,5			TP: Research article (6 publication-formatted pages); SL: Presentation of literature relevant to a selected topic 30 Min.	1
	Research Project Implementation				2			2,5				
RL-V4: Methods in Earth System Sciences II PB-V4: Palaeobiology II	Laboratory methods in palaeontology		2			5		2,5			TP: Assignment (max. 10 pages)	0
	Biofacies and Palaeoecology		2					2,5				
RL-F1: Earth Systems Research Lab IV	Science Communication				3	5			5		Presentation (60 Min.)	1
RL-F2: Methods in Earth System Sciences III: AS-F2 Sedimentary geochemistry	Geochemical Proxies in Palaeoenvironmental Analysis	2				5			2,5		TP: WE ¹ 60 Min.	0
	Geochemical Proxies in Palaeoenvironmental Analysis - lab	1	1						2,5			
AG-V3b: Environmental Hydrogeology*	Tracers, Isotopes & Natural Attenuation		4			5	5				TP: Klausur 60 Min.	1
PB-E2: Analytical Palaeobiology*	Analytical Palaeobiology		4			5		5			TP: Presentation 20 Min.	1
		0-3	11-14	0	9	30	10	10	10	0		
		Total SH: 23				30						

* Alternative module if a module above already part of Master

¹ WE = Written Exam.

Module catalog: Geoscientific elective module

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
Materials sciences						5	5					0
Chemistry						5	5					0
Astronomy						5	5					0
Computer sciences						5	5					0
Computer in Geosciences						5	5					0
Geography						5	5					0
Biology						5	5					0

Module catalog: Geoscientific SQ-Module

Module Label	Course	SWS				Total ECTS	Workload distribution per semester in ECTS-Points				Type and extend of the exam/academic achievement	Factor Module grade
		V	Ü	P	S		1. Sem	2. Sem	3. Sem	4. Sem		
Industrial placement (4 weeks)						5		(5)	(5)			0
Mapping (12 days)						5		(5)	(5)			0
Field Exercises (12 days)						5		(5)	(5)			0
Project or comparable work (4 weeks)						5		(5)	(5)			0