Universität Bremen

module code / module title

05-BMG-EE1 /Introduction to Earth Dynamics

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-EE1
1b	module title *(German title)*	Introduction to Earth Dynamics
1c	module title *(English title)*	Introduction to Earth Dynamics
1d	credit points	6
1e	responsible for the module	Mollenhauer, Gesine
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	This module deals with the main principles of geology and dynamics of Earth, and with the main processes which shape our planet. The lecture will provide an understanding of the distribution of constituents in core, mantle and crust and of the interaction between plate tectonics and volcanism with hydrosphere, cryosphere, atmosphere and biosphere as well as of the rock cycle. This theoretical background will be implemented by practical exercises to recognise rock-forming processes and rock-building minerals of sedimentary, igenous and metamorphic rocks in the laboratory and in the field. Basic skills of geological fieldwork will be devoloped during a four-days integrated field trip to the Harz Mountains.

1k	learning outcomes/ competencies/ targeted competencies	1) students gain an understanding of processes acting in the Earth system and are able to recognise them in rocks as well as in the field 2) understand basic geological and mineralogical concepts related to the rock cycle 3) address and recognise the main rock-forming minerals and rocks 4) apply autonomously simple geological mapping techniques in the field
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Field Exercise 28.0 h working hours

with	2	SWS / with totaly	28	contact hours	☐ presence time	☑ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 28 h = total 84.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 56.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Press and Siever (2019), Understanding Earth (4th edition), WH Freeman, 697 p. 2) Jhariya, Vishwakarma, Diwan (2017), Essentials of Geological Fieldwork, LAP Lambert Academic Publishing, 84 p. 3) Fischer and Pätzold (2019), Skript zur Übung Gesteinskunde (in German / translation coming)
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☑ SL | 1 ☐ PVL | justification If necessary, further explanations: Other form of examination: Assessment of field competence (4-days fieldexercise = BMG-EE1-3)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % oral exam PL 2: 0 % Other form of examination PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☑ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☑ Other (concrete definition is given in the examination regulations): Other form of examination
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-ME1 /From Atoms to Minerals - Mineralogy and Crystallography

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-ME1
1b	module title *(German title)*	From Atoms to Minerals - Mineralogy and Crystallography
1c	module title *(English title)*	From Atoms to Minerals - Mineralogy and Crystallography
1d	credit points	6
1e	responsible for the module	Lüttge, Andreas
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	Basic concepts of mineralogy and crystallography / introduction to mineral systematics / overview of important analytical methods for materials and minerals.
1k	learning outcomes/ competencies/ targeted competencies	Students understand crystalline matter, e.g. minerals from the atomic to macroscopic scales. Students have acquired knowledge of mineral systematics and are capable of identifying macroscopically important minerals such as rock forming silicates. Students know the main methods and phenomena of materials analyses.

		Students recognize the main concepts of mineral formation/degradation, that are critical for material- and geosciences.
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 84.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ Eng l i sh ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) presented slides 2) Okrusch/Frimmel, Mineralogy, Springer 3) Borchardt-Ott/Gould, Crystallography: An introduction, Springer
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:

2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-CP1 /Chemical Principles of Geosciences I

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-CP1
1b	module title *(German title)*	Chemical Principles of Geosciences I
1c	module title *(English title)*	Chemical Principles of Geosciences I
1d	credit points	6
1e	responsible for the module	Hehemann, Jan-Hendrik
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 02: Biology/ Chemistry
1i	content-related prior knowledge or skills	
1j	learning contents	Students take a course in General Chemistry offered by lectures from the Chemistry Department. The module encompasses a lecture series and a practical part, in which the theoretical topics from the lectures will be applied. The courses aim at providing geoscience students the required fundamental of inorganic, organic, and physical chemistry. These fundamentals are key to using a range of methods in geoscience, to which the students will be exposed in the course of the B.Sc. program.
1k	learning outcomes/ competencies/ targeted competencies	1) Refreshing basic knowledge in general chemistry 2) Recognizing the relations between chemical composition and properties of materials

		3) Mastering the fundamentals required for attending of the advanced classes in the string of modules. 4) Mastering stoichiometric calculations
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	4	SWS/ contact hours	56	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 6 SWS (84 h) and

Working hours: 0 h = total 84.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 56.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	Introductory books to chemistry
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-PP1 /Physical Principles of Geosciences I

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PP1
1b	module title *(German title)*	Physical Principles of Geosciences I
1c	module title *(English title)*	Physical Principles of Geosciences I
1d	credit points	6
1e	responsible for the module	Pérez Gussinyé, Marta
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	This module teaches the physical fundamentals necessary for the understanding of many geoscientific processes. This implies that in the context of the events of `Physics I` physical foundations of classical mechanics, i.a. Newton´s axioms, laws of conservation of energy and momentum, motion of extended bodies) and optics (including ray optics, lenses: refraction, diffraction and interference, optical instruments). These are applied and deepened in two experiments each from the two subject areas in the ´Physikpraktikum-I´. Moreover, these physical principles serve to better understand the physical processes that shape the shape of the earth and give insight into the physical structure of the earth. This knowledge of the ´physics of the earth´ is taught using the example of knowledge about the structure of the earth, plate tectonics and wave propagation in the underground (seismology).

1k	learning outcomes/ competencies/ targeted competencies	1) Understand the physical foundations of classical mechanics and optics 2) Apply the physical principles of mechanics and optics in two experiments each (e.g., O1 lens law, O4 wavelength measurement, M1 spring, M6 torque) 3) Know the structure of the earth and the drive mechanisms that shape the shape of the earth and the principles of plate tectonics 4) Understand physical processes that provide information about the structure of the earth and about wave propagation through the earth body
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1,5	lecture(s) with	3	SWS/ contact hours	42	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☑	1	laboratory/laboratories with	1	SWS/ contact hours	14	total hours of presence time
☑	.	tutorial(s) with	1 / 14	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

		Presence time: 6 SWS (84 h) and Working hours: 0 h = total 84.0 hours
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 64.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 32.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Fowler, C.M.R., The Solid Earth: an Introduction to Global Geophysics, Cambridge University Press 2) Lowrie, W.: Fundamentals of Geophysics. Cambridge Univ. Press, Cambridge. 3) Physics of Earth, Stacey, F.D., Davis, P. M., Cambridge University Press

		4) An Introduction to our Dynamic Planet, Blake, S., Burton, K., Harris, N., Parkinson, I., Rogers, N., Widdowson, M., Cambridge University Press
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☑ SL | 1 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % written exam PL 2: 50 % written exam PL 3: 0 % internship report PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☑ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-MP1 /Mathematical Principles of Geosciences I

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-MP1
1b	module title *(German title)*	Mathematical Principles of Geosciences I
1c	module title *(English title)*	Mathematical Principles of Geosciences I
1d	credit points	6
1e	responsible for the module	Prange, Matthias
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 03: Mathematics / Computer Sciences
1i	content-related prior knowledge or skills	
1j	learning contents	The course is application-related and focuses mainly on the mathematical needs of the physics module. Topics include sequences, series, functions, differential and integral calculus, vector calculation, ordinary differential equations, probability and statistics, and matrices and systems of linear equations.
1k	learning outcomes/ competencies/ targeted competencies	1) Students can solve basic mathematical problems within a geoscientific context 2) Students can use special mathematical methods that are important to geoscientific work practice

		3) Students have a basic understanding of the mathematical modeling of simple physical and geoscientific problems 4) Students can apply basic statistical methods to geoscientific data
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 39.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 85.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Mathematics for Physicists (A. Altland & J. von Delft), Cambridge Univ. Press 2) Statistics and Data Analysis in Geology (J. C. Davis), Wiley 3) Thomas' Calculus, Addison Wesley 4) Handbook of Mathematics and Computational Science (J. W. Harris & H. Stocker), Springer
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

Universität Bremen

module code / module title

05-BMG-EE2 /Evolution of Earth and Life

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-EE2
1b	module title *(German title)*	Evolution of Earth and Life
1c	module title *(English title)*	Evolution of Earth and Life
1d	credit points	6
1e	responsible for the module	Kucera, Michal
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Introduction to Earth Dynamics
1j	learning contents	In three thematic blocks - Earth and Life History - Basics of Palaeontology - Biology for Geoscientists - the course will cover basic concepts of the history of the Earth and of life in close connection with the basics of Palaeontology and Biology. Against the background of 4.6 billion years of geotectonic and climatic changes on our Planet, we will explore the causes and consequences of major events shaping the current face of the Earth, explore how the history of Earth is connected with the evolution of life and how these interactions affected the development of the Ocean and the Atmosphere.

1k	learning outcomes/ competencies/ targeted competencies	1) Understand the concept of geological time and the sequence and causes and consequences of key events in the evolution of the Earth system 2) Understand feedbacks between biological and geological processes acting on geological time scales 3) Identify and describe fossils and understand their preservation and applications 4) Obtain basic knowledge of biological processes relevant for Earth and Ocean Sciences
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	2	lecture(s) with	4	SWS/ contact hours	56	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

Presence time: 5 SWS (70 h) and

Working hours: 0 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 70.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☑ Nebenfächler können bei Bedarf auch nur die LV Erdgeschichte (2 SWS) wählen
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Stanley, S.M. and Luczaj, J.A., 2014. Earth system History. Freeman. 2) Benton, M. and Harper, D.A.T., 2009. Basic Paleontology. Wiley-Blackwell. 3) Reece et al., 2019. Campbell Biology. Cummings.
1r	more information on the module (*optional*)	Fossilienpraktikum wird 2-stündig jede zweite Woche angeboten, in Gruppen von max. 25 Personen
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations: Nebenfächler beantworten nur Fragen zu LV Erdgeschichte (2 SWS)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-ME2 /Structural Geology and Tectonics

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-ME2
1b	module title *(German title)*	Structural Geology and Tectonics
1c	module title *(English title)*	Structural Geology and Tectonics
1d	credit points	6
1e	responsible for the module	Lisker, Frank
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	The module provides insight into the basics of structural geology and tectonics and the presentation of linear structures, planes, and bodies in diagrams and maps, and into the geological architecture of central Europe resulting from plate tectonic processes. The first part of the Structural Geology lecture gives an overview about the physical background and deals with genetics, properties, and kinematic indications of the most crucial tectonic structures, with particular focus on faults and folds. The second part of the lecture focusses on the stereographic projection of linear and planar structures in the Schmidt Net and on reconstructions based on this projection. The Geological Map course complements the analysis of geological structures by the concept of geological maps and exercises the construction of maps and transects. This theoretical background will then be applied in the Field exercise Structural Geology in the Harz

		Mountains. The lecture Regional Geology focusses on the relation between global and local geological processes and associated environments on the basis of the regional division of central Europe.
1k	learning outcomes/ competencies/ targeted competencies	1) recognise and determine tectonic features 2) understand and apply stereographic projection and analysis of linear and planar structures 3) analyse and construct geological maps and sections 4) reconstruct tectonic processes and regimes 5) correlate lithological units with structural domaines 6) train team competence and improve presentation skills
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	3	SWS/ contact hours	42	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☑	.	tutorial(s) with	1 / 14	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Field Exercise 14.0 h working hours

with	1	SWS / with totaly	14	contact hours	☐ presence time	☑ working hours

= sum of presence time and working hours:

Presence time: 6 SWS (84 h) and

		Working hours: 14 h = total 98.0 hours
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 42.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 98.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	Other, namely this 1 semester plus block course
1q	Literature (*optional*)	1) Fossen, H., 2010. Structural Geology. Cambridge (geo 326/666), 463 S. 2) Bennison, G.M., 1989. An introduction to geological structures and maps. (geo 326 ef / geo 010.3 ef / geo 326 / geo 010.3), 69 S. 3) Park, G., 2014. The making of Europe. Dunedeen, 164 S.

1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☑ SL | 1 ☐ PVL | justification If necessary, further explanations: Study performance: Participation in the Field Exercise Structural Geology (05-BMG-ME2-2)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-CP2 /Chemical Principles of Geosciences II

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-CP2
1b	module title *(German title)*	Chemical Principles of Geosciences II
1c	module title *(English title)*	Chemical Principles of Geosciences II
1d	credit points	6
1e	responsible for the module	Hinrichs, Kai-Uwe
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	
1i	content-related prior knowledge or skills	Participation in module Chemical Principles of Geosciences I, high-school level knowledge in Chemistry and Mathematics
1j	learning contents	This module will establish basic practical knowledge in chemical laboratory techniques and a theoretical background of relevance to geoscientists in aquatic chemistry, organic chemistry and chemistry of rocks. We will convey basic knowledge regarding the origin of the solar systems and chemical elements as well as the chemical composition of the Earth. These basics are essential for all geochemisty related subjects in subsequent semesters. Basic geochemical concepts such as fluxes, reservoirs, and residence times will be illustrated with examples. Isotopes are introduced and their utility as geochemical tracers as well as sources of information about geobiological processes will demonstrated with examples. The hydrological cycle will be introduced. Emphasis will be placed on the physical and chemical

		properties of water, physicochemical reactions in solution, and on water-rock reactions. In organic chemistry, we will introduce chemical compound classes, natural products, and introductory knowledge in stereochemistry. Die knowledge will be required for an understanding of the composition of organic matter in sedimentary rocks. Chemical degradation reactions that occur in nature on a range of temporal scales will be treated. Additionally, relevant basic knowledge in analytical techniques such as chromatographic separation and mass spectrometry will be discussed. The practical laboratory techniques will focus on basic operations such as pipetting, dilution of solutions, and the determination of simple chemical parameters. Additionally, basic knowledge in stoichiometry and chemical formulas will be established during experiments and their evaluation.
1k	learning outcomes/ competencies/ targeted competencies	1) The students will gain basic knwoledge of chemical principles that are relevant to the geosciences and required for subsequent emphasis of geochemistry as well as a mechanistic understanding of numerous general investigative techniques within the geosciences. 2) The students will have gained an in-depth understanding of chemical processes from theory and experimentation. The experiments cover basic chemical phenomena, principles and introductory analytical chemistry. 3) The students will understand the principles of qualitative chemical analyses and are able to conduct these analyses in the lab. 4) Students will acquire team competencies and the ability to carefully plan, execute, document and evaluate experiments.
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	4	SWS/ contact hours	56	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

		☐ other form of course (e.g. block seminar), namely this: with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours = sum of presence time and working hours: Presence time: 6 SWS (84 h) and Working hours: 0 h = total 84.0 hours
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 56.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ Eng l i sh ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module

1q	Literature (*optional*)	1) Walther: Essentials of Geochemistry, 2008. Cambridge University Press 2) Rampf und Sammer: Chemie. Organische Chemie. Grundwissen, 2004. Langenscheidt 3) Langmuir: Aqueous Environmental Geochemistry, 1996. Prentice Hall 4) A set of written guidelines, safety instructions, and description of the experiments performed in the lab course will be made available via Stud.IP before the lab course.
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☑ SL | 1 ☐ PVL | justification If necessary, further explanations: A written report documenting the experiments and their evaluation needs to be completed and passed at the 70% level.
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: 0 % internship report PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☑ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):

2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-PP2 /Physical Principles of Geosciences II

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PP2
1b	module title *(German title)*	Physical Principles of Geosciences II
1c	module title *(English title)*	Physical Principles of Geosciences II
1d	credit points	6
1e	responsible for the module	Pérez Gussinyé, Marta
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	This module teaches the physical fundamentals necessary for the understanding of many geoscientific processes. This implies that in the context of the events of "Physics I" physical foundations of thermodynamics such as equation of state, pressure and energy, principles of thermodynamics and electrodynamics (electrical charge and field, electrical flows and magnetic field, field intensity, potential, voltage, resistance) are taught. These are applied and deepened in two experiments each from the two subject areas in the "Physikpraktikum-I" Moreover, these physical principles serve to better understand the physical processes that shape the shape of the earth and give insight into the physical structure of the earth. This knowledge of the "physics of the earth" is taught using the example of knowledge about temperature, magnetic and gravity field.

1k	learning outcomes/ competencies/ targeted competencies	1) Understand the principles of thermodynamics and electrodynamics 2) Use the physical principles of thermodynamics and electrodynamics in three experiments 3) Know the temperature field of the earth, its structure as well as the different types of heat propagation 4) Know potential fields, like the magnetic and gravity field of the earth, their structure and how they are measured.
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1,3	lecture(s) with	2,7	SWS/ contact hours	37,33	hours of presence time
☑	0,3	seminar(s) with	0,3	SWS/ contact hours	9,33	hours of presence time
☑	0,3	exercise(s) with	0,7	SWS/ contact hours	9,33	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☑	1	laboratory/laboratories with	1	SWS/ contact hours	14	total hours of presence time
☑	.	tutorial(s) with	1 / 14	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

Presence time: 6 SWS (84 h) and

Working hours: 0 h = total 84.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 64.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 32.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Fowler, C.M.R., The Solid Earth: an Introduction to Global Geophysics, Cambridge University Press 2) Lowrie, W.: Fundamentals of Geophysics. Cambridge Univ. Press, Cambridge. 3) Physics of Earth, Stacey, F.D., Davis, P. M., Cambridge University Press 4) An Introduction to our Dynamic Planet, Blake, S., Burton, K., Harris, N., Parkinson, I., Rogers, N., Widdowson, M., Cambridge University Press
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	

2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☑ SL | 1 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % written exam PL 2: 50 % written exam PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-MP2 /Mathematical Principles of Geosciences II

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-MP2
1b	module title *(German title)*	Mathematical Principles of Geosciences II
1c	module title *(English title)*	Mathematical Principles of Geosciences II
1d	credit points	6
1e	responsible for the module	Huhn-Frehers, Katrin
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 03: Mathematics / Computer Sciences
1i	content-related prior knowledge or skills	
1j	learning contents	The course is application-related and focuses on the mathematical needs of the physics module. Therefore topics include multivariable functions, scalar and vector fields, vector analysis, multiple integrals, partial differential equations, Fourier series. In addition, basic statistical methods for geoscientists are addressed including statistical tests, correlation and regression, cluster analysis.
1k	learning outcomes/ competencies/ targeted competencies	1) Students can solve basic math problems within a geoscientific context 2) Students can use special mathematical methods that are important to geoscientific work practice

		3) Students have a basic understanding of the mathematical modeling of simple physical and geoscientific problems 4) Students can apply basic statistical methods to geoscientific data
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 39.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 85.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Mathematics for Physicists (Altland & von Delft), Cambridge Univ. Press / Handbook of Mathematics and Computational Science (Harris & Stocker), Springer 2) Statistics and Data Analysis in Geology (J. C. Davis), Wiley / Introduction to Geological Data Analysis (Swan & Sandilands), Blackwell 3) Thomas' Calculus, Addison Wesley 4) Stud IP downloads
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	

2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-EE3 /Physical, Chemical and Biological Oceanography

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-EE3
1b	module title *(German title)*	Physical, Chemical and Biological Oceanography
1c	module title *(English title)*	Physical, Chemical and Biological Oceanography
1d	credit points	6
1e	responsible for the module	Paul, André
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Fundamentals of Physics and Chemistry
1j	learning contents	This module introduces the basic processes in the atmosphere and ocean, investigates their essential forcing factors and explains the interaction between the two systems. Selected physical aspects are the Earth´s energy and water balances, the general circulation of the atmosphere, the wind-driven and thermohaline circulation of the ocean, the water masses and their formation as well as coastal upweling. Furthermore, it provides an overview of the biological productivity and carbon export in the ocean and their relation to macronutrients, trace elements and the ocean circulation. Exercises are an intergral part of this module and allow for a deeper insight in the important physical-chemical-biological processes in the atmosphere and ocean.

1k	learning outcomes/ competencies/ targeted competencies	to identify key factors influencing the Earth´s climate system to describe the processes that cause large-scale ocean currents to recognize that ocean currents, marine life and the turnover of energy and matter are closely interlinked to explain the elementary marine biogeochemical processes and outline the ""biological pump"" and its role in the marine carbon cycle
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

Presence time: 5 SWS (70 h) and

Working hours: 0 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 42.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 68.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	Other, namely this 1 semester plus block course
1q	Literature (*optional*)	Charles Cockell et al.: An Introduction to the Earth-Life System. Cambridge University Press, 326 pp.,2008. Hartmann, Dennis L.: Global Physical Climatology. Elsevier, 2nd edition, 498 pp., 2016. Open University: Ocean Circulation. Butterworth-Heinemann, 2nd revised edition, 286 pp., 2004.
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-ME3 /Geology and Stratigraphy of Marine Sediments

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-ME3
1b	module title *(German title)*	Geology and Stratigraphy of Marine Sediments
1c	module title *(English title)*	
1d	credit points	6
1e	responsible for the module	Bohrmann, Gerhard
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	This module provides the basic knowledge of ocean sediment formation and distribution, fluid and gas circulation and its manifestation on the seafloor. Coral reefs and sea-level fluctuations are additional topics. It further introduces stratigraphic methods and their application to marine sedimentary archives. The module is complented by a 1-day ship-based survey which allows to get familiar with the most common techniques for sediment sampling and investigation on sea.
1k	learning outcomes/ competencies/ targeted competencies	to describe the processes for marine sediment formation and distribution and understand fluid flow processes below and above the seabed to understand and critical questioning the dating of marine sediments

		to be trained in the most common methods related to work with marine sediments on board to be able to combine principle knowledge in oceanography and climatology with sedimentary record investigation
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1,5	lecture(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1,5	SWS/ contact hours	21	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Block Course 14.0 h working hours

with 1 SWS / with totaly 14 contact hours ☐ presence time ☑ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 14 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 70.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	Other, namely this 1 semester plus block course
1q	Literature (*optional*)	Seibold, E. & Berger, W.H. (1996) The Sea Floor. An Introduction to Marine Geology. Springer, Heidelberg, 3. Aufl., 356 p. The Open University (2005) Marine Geochemistry. Pergamon Press
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification

		If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % oral exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☑ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

Universität Bremen

module code / module title

05-BMG-CP3 /Rock-Forming Processes

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-CP3
1b	module title *(German title)*	Rock-Forming Processes
1c	module title *(English title)*	Rock-Forming Processes
1d	credit points	6
1e	responsible for the module	Bach, Wolfgang
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	
1i	content-related prior knowledge or skills	
1j	learning contents	In "Principles of Petrology" the fundamental concepts of the rock cycle, including mantle melting, magmatism, weathering, diagenesis and compaction, subduction and metamophism will be covered in lectures and exercises on the basis of petrological principles. The use of phase diagrams will be tought and practised. Simple calculations will also be conducted to demonstrate the thermodynamic underpinning of phase diagrams. Rock-forming processes in a range of geotectomic settings will also be discussed. Emphasis will be put on how the rock cycles has regulated atmosphere and ocean compostions throughout our planet´s history. The course "Polarized-light Microcopy" includes an introduction to the theory of ploarized-light microscopy and a practical part in which thin sections and smear slides are examined under the microcope. Topics include: Introduction to polarized-light microcscopy in theory andpractise, Orthoscopy:

		refractive indexes, Relief, Beck-Line, birefringence (interference colors, extinction, optical character, and consocopy. Optical properties and identification of major rock-forming minerals will be covered.
1k	learning outcomes/ competencies/ targeted competencies	1) Understanding the basic theory and practise of polarized-light microscopy 2) Determination of optical properties of rock-forming minerals in thin section and mineral identification 3) Application of petrological principles in analyzing rock- and mountain-forming processes and how they set ocean composition 4) Reading phase diagram and conducting simple computations of phase relations
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 5 SWS (70 h) and

		Working hours: 0 h = total 70.0 hours
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 70.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Best, M.G. (2003), Igneous and Metamorphic Petrology, eBuch, 729 Seiten 2) Boggs, S. Jr. (2009) Petrology of Sedimentary Rocks, eBuch, 600 Seiten 3) Raith, M.M. & Raase, P. (2009) Guide to thin section microscopy, eBuch, 127 Seiten

1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☑ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % written exam PL 2: 50 % written exam PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-PP3 /Principles of Applied Geophysics

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PP3
1b	module title *(German title)*	Principles of Applied Geophysics
1c	module title *(English title)*	Principles of Applied Geophysics
1d	credit points	6
1e	responsible for the module	Dobeneck, Tilo von
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Physical Priciples of Geosciences and Physics of the Solid Earth
1j	learning contents	This module imparts theoretical and practical basics of the most important geophysical methods for subsurface exploration, e.g. seismic, gravity, magnetic, electrical, and radar surveying. Departing from the physical principles and geological premises for each method, we will deal with measurement instrumentation, data processing and interpretation and present typical application scenarios. During a two day field course in the Bremen "Blockland", all participants will practically conduct all introduced methods themselves. Following a data processing scheme, that is prevously trained in class, they analyze and interpret their field data and return their results as a written report.

1k	learning outcomes/ competencies/ targeted competencies	Course participants 1) understand the physical principles and geological applicability of the most important wavefront, potential and induction methods in geophysical exploration 2) are able to follow and evaluate the results and basic intentions of geophysical surveys in science and industry 3) are able to propose and carry out a measurement strategies for a given small-scale geophysical exploration issue and to analyze the acquired data in elementary ways 4) write methodologically correct, substantial, stylishly and graphically appealing reports on the their field surveys using basic processing and graphics software
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	1,5	SWS/ contact hours	21	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1,5	SWS/ contact hours	21	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Field Exercise 14.0 h working hours

with	1	SWS / with totaly	14	contact hours	☐ presence time	☑ working hours

= sum of presence time and working hours:

Presence time: 3 SWS (42 h) and

Working hours: 14 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 42.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 82.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	Other, namely this 1 semester plus block course
1q	Literature (*optional*)	1) P. Kearey, M. Brooks und I. Hill, 2002, An introduction to geophysical exploration, Blackwell Science 2) J.M. Reynolds, 1997, An introduction to applied and environmental geophysics, Wiley 3) A.E. Musset und M.A. Khan, 2000, Looking into the Earth: An introduction to geological geophysics, Cambridge University Press

1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations: Written exam graded individual, report graded in group of two students
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % written exam PL 2: 50 % internship report PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☑ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

Universität Bremen

module code / module title

05-BMG-MP3 /Multidisciplinary Marine Sediment Core Project

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-MP3
1b	module title *(German title)*	Multidisciplinary Marine Sediment Core Project
1c	module title *(English title)*	Multidisciplinary Marine Sediment Core Project
1d	credit points	6
1e	responsible for the module	Dobeneck, Tilo von
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Basic competences in Powerpoint (oral presentation) and Corel Draw (scientific poster)
1j	learning contents	The 16-20 participants of each project course jointly investigate a scientifically attractive marine sediment core applying a wide method range (e.g. core description, core logging, echosounding, proxy methods, micropaleontology, geochemistry, sedimentology, mineralogy, environmental magnetism, chronostratigraphy). Organized in teams of 4 students, they work half-days in research labs of supporting expert scientists. Each student takes responsibility for a certain method, analyses the jointly collected data, and presents the results orally in a final exam colloquium. Subgroups of 5-6 students interpret their complementary results in a scientific poster. Presentation skills are trained during the class.

1k	learning outcomes/ competencies/ targeted competencies	Participants 1) understand and exemplarily apply the modern multidisciplinary methodology of marine sediment core research within in a practical, coordinated team project 2) perform method-specific laboratory analytics, process experimental data, and create computer graphics to visualize, compare and communicate own scientific outcomes 3) elucidate own experimental results by accessing relevant context information from scientific articles, cruise reports and personal discussions with expert advisors 4) demonstrate and systematically improve personal skills in scientific teamworking, project management, communication and presentation (poster and oral)
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☐	0	lecture(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☑	.	tutorial(s) with	1 / 14	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Project Exercise 56.0 h working hours

with	4	SWS / with totaly	56	contact hours	☐ presence time	☑ working hours

= sum of presence time and working hours:

Presence time: 1 SWS (14 h) and

Working hours: 56 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 50.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 60.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Regionally relevant geoscientific journal articles and textbook chapters made available in Stud.IP download 2) Introductory Powerpoint scripts and special processing software provided by method advisors 3)

		4)
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations: Oral grades are invidual, poster grades collective. Scientific and didactic quality are separately evaluated (50:50)
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 67 % presentation PL 2: 33 % poster PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☑ Other (concrete definition is given in the examination regulations): poster presentation
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GF1 /Geoscientific Field Competence

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GF1
1b	module title *(German title)*	Geoscientific Field Competence
1c	module title *(English title)*	Geoscientific Field Competence
1d	credit points	6
1e	responsible for the module	Bickert, Torsten
1f	type of module	compulsory elective module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	Excursions allow deepening of geoscientific content in the field. Depending on the main topic, rocks in geological outcrops are examined petrographically, sedimentologically and / or paleontologically and processed in a tectonic-regional geological context. Alternatively, field data are interpreted using geophysical methods, or in the applied area of industrial plants, mines, processing plants, etc. visited. Other special thematic priorities are possible.
1k	learning outcomes/ competencies/ targeted competencies	- Learning geoscientific field work in combination with three-dimensional imagination in practice. - Training in qualified sampling, which precedes sample processing in the laboratory and its interpretation

		- Classification of local and regional finding
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☐	0	lecture(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Field Exercise 84.0 h working hours

with 6 SWS / with totaly 84 contact hours ☐ presence time ☑ working hours

= sum of presence time and working hours:

Presence time: 0 SWS (0 h) and

Working hours: 84 h = total 84.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 56.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ Eng l i sh ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	Due to the varying regional and subject-specific focal points, accompanying documents are provided.
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:

		Usually, one examination is performed per 7-day excursion. However, this can vary depending on the chosen field trips.
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % field trip report PL 2: 50 % field trip report PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☑ Other (concrete definition is given in the examination regulations): field trip report
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GS1 /Digital Competences

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GS1
1b	module title *(German title)*	Digital Competences
1c	module title *(English title)*	Digital Competences
1d	credit points	6
1e	responsible for the module	Dobeneck, Tilo von
1f	type of module	compulsory elective module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Fundamentals of logics, algebra, analysis, statistics, numerical mathematics, geometry and cartography
1j	learning contents	This computer skills module provides all students with an obligatory organisational framework, which is flexible in terms of topics and time, allowing them to safely learn the theory and practice of the digital data processing methods commonly used in geostudies as well as in typical geoscientific professions. Our wide range of topic-specific computer courses uses industry-standard software and a variety of geoscientific data examples to impart essential IT skills, e.g. in spreadsheet calculation, programming, computer graphics and geoinformation. To fulfill this module, all successfully completed block courses up to 6 CP will be credited.

1k	learning outcomes/ competencies/ targeted competencies	Partcipants 1) develop individual solution strategies for tasks in geoscientific data processing and successfully implement them using suitable software 2) numerically and logically process, statistically analyze and graphically display geoscientific data by means of own EXCEL and MATLAB programming 3) create construction- and data-based diagrams and maps in publication quality with specialized graphics software (COREL, GRAPHER, SURFER, QGIS, GMT) 4) competent use of computer hardware and application software, digital measuring instruments, databases, digital media and services (e.g. learning platforms)
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☐	0	lecture(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Block Course 84.0 h working hours

with 6 SWS / with totaly 84 contact hours ☐ presence time ☑ working hours

= sum of presence time and working hours:

Presence time: 0 SWS (0 h) and

Working hours: 84 h = total 84.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 56.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☑ COREL, GRAPHER/SURFER, GMT (1 day/0.5 CP each), EXCEL, Matlab/Python, QGIS/ArcGIS (3 days/1.5 CP each)
1n	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	Other, namely this block course
1q	Literature (*optional*)	1) Own course material and exercise files "EXCEL for Geos" #1 - #6 (Download Stud.IP) 2) Own course materials (Download Stud.IP) and online tutorials for COREL, GRAPHER, SURFER, GMT, Matlab, Python 3) Literature and course materials for GIS

1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☐ PL | 0 ☑ SL | 1 ☐ PVL | justification If necessary, further explanations: The module must be passed. A set of course tasks must be submitted.
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 0 % Portfolio PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☑ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-SE1 /Sedimentology of Coast and Shelf

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-SE1
1b	module title *(German title)*	Sedimentology of Coast and Shelf
1c	module title *(English title)*	Sedimentology of Coast and Shelf
1d	credit points	6
1e	responsible for the module	Miramontes García, Elda
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	Coasts and shelves are areas where natural processes and ecosystems are often affected by human activities: e.g. extraction of mineral resources, fishing, offshore infrastructures and energy, maritime transport and coastal infrastructures. Moreover, sea-level rise and climate change can profoundly affect the equilibrium and evolution of coastal sedimentary systems. This module covers the description of the different depositional systems that can be found in siliciclastic and carbonate environments and the methods for their identification (e.g. bathymetry, seismic, sediment cores, well logging). The processes involved in erosion, transport and accumulation of sediment in coast and shelf systems, and the effect of climate and sea-level changes will be also discussed. Basic concepts of basin analysis, sequence stratigraphy and

		well logging will be introduced to explain and practice paleoenvironmental reconstructions from geological records (e.g. sediment supply, subsidence, sea level, paleocurrents).
1k	learning outcomes/ competencies/ targeted competencies	1) Recognise coastal and shelf siliciclastic and carbonate depositional systems and comprehend the processes at their origin 2) Identify shallow-water depositional systems and their evolution based on their sedimentation patterns 3) Understand the role of sea-level oscillations in the factors affecting sedimentation (e.g. sediment supply, hydodynamic conditions, morphology and position of the coast) 4) Understand the effect of climate and environmental changes in coastal carbonate production
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

		Working hours: 0 h = total 56.0 hours
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 64.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 60.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) TUCKER, M.E. & WRIGHT, V.P. 1990. Carbonate Sedimentology. Blackwell, Oxford. 482 p 2) SCHÄFER, A. 2005. Klastische Sedimente - Fazies und Sequenzstratigraphie. Elsevier / Spektrum Akademischer Verlag, München, 414 pp. 3) READING, H.G. (ed.) 1996. Sedimentary Environments: Processes, Facies and Stratigraphy. 3rd Edition. Blackwell Science (Oxford), 688 pp.

		4) LEEDER, M. 1999. Sedimentology and Sedimentary Basins. Blackwell Science, Oxford, 592 pp.
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-PA1 /Introduction to Paleontology and Paleoecology

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PA1
1b	module title *(German title)*	Introduction to Paleontology and Paleoecology
1c	module title *(English title)*	Introduction to Paleontology and Paleoecology
1d	credit points	6
1e	responsible for the module	Zonneveld, Karin
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	This module consists of two courses. Course 1 lays the foundation for understanding fossil invertebrate faunas. First, the application-oriented classification and determination of fossils will be practiced. In addition to aspects of the systematic classification of animal groups, application examples of biostratigraphy and palaeobiogeography will be specifically addressed. Subsequently, different preservation patterns of fossil invertebrates are addressed, including their mineralogic composition and ultrastructure / gaps and potential of preservation will be identified. Finally, the knowledge will be interlinked and discussed in practical exercises on fossil associations, including palaeoecological aspects with respect to the reconstruction of fossil ecosystems. Course 2 teaches (paleo-)ecological basics and working techniques. In addition to basic knowledge of the interactions between the bio- and geosphere, the content of the course covers fundamentals that are of essential importance for critically examining current

		developments in methods and techniques with questions on evolution, the palaeoenvironment, palaeoceanography and palaeoclimatology. The following topics will be discussed by means of interactive lectures and exercises: (1) Morphological, physiological and population dynamic adaptation to environmental conditions and their transmission in the logical past / (2) marine and terrestrial ecosystems today and in the past / (3) biodiversity and geography / (4) environmental protection. During a stay at the Senckenberg Institute in Wilhelmshaven, recent ecosystems and their fossil conservation potential will be studied and discussed during several field exercises.
1k	learning outcomes/ competencies/ targeted competencies	1) Independently classify the systematic affiliation of fossil invertebrates, based on the actually observed criteria, including differential diagnosis and applying exclusion criteria 2) Independently recognise taphonomic patterns of marine invertebrates 3) Date sedimentary rocks in the field by the application of biostratigraphic knowledge 4) Interprete fossiliferous rocks in the field and handpieces in terms of palaeoenvironmental and understand basic concepts of invertebrate fossil associations and their palaeoecology. 5) Understand palaeo-ecological, taphonomic and actuo-palaeoenvironmental principles. 6) Know basic biological principles essential for palaeo-ecological, palaeo-oceanographic, palaeo-climatological and geochemical investigations. 7) are able to apply laboratory knowledge and skills required in palaeoecological research.
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	1,5	SWS/ contact hours	21	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1,5	SWS/ contact hours	21	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

		☑ other form of course (e.g. block seminar), namely this: Field Exercise 42.0 h working hours with 3 SWS / with totaly 42 contact hours ☐ presence time ☑ working hours = sum of presence time and working hours: Presence time: 3 SWS (42 h) and Working hours: 42 h = total 84.0 hours
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 56.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ Engl i sh ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	Other, namely this 1 semester plus block course

1q	Literature (*optional*)	1) Handouts will be provided in the course 2) DOYLE, P. 1996. Understanding Fossils: An introduction to invertebrate palaeontology. Wiley, Hoboken, 424 pp 3) JAIN, S. 2017. Fundamentals of Invertebrate Palaeontology. Macrofossils. Springer Geology, Springer, 405 pp. 4) CLARKSON, E. N. K. 1998. Invertebrate palaeontology and evolution. Blackwell Publishers, London, 452 pp / 5) MUTTERLOSE, J. 2018. Einführung in die Paläobiologie Teil 1. Allgemeine Paläontologie. Schweizerbart, Stuttgart, 320 pp.
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☑ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % written exam PL 2: 50 % written exam PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):

2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GC1 /Geochemical Processes and Isotope Geochemistry

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GC1
1b	module title *(German title)*	Geochemical Processes and Isotope Geochemistry
1c	module title *(English title)*	Geochemical Processes and Isotope Geochemistry
1d	credit points	6
1e	responsible for the module	Kasemann, Simone
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	
1i	content-related prior knowledge or skills	
1j	learning contents	The module focuses on methods and research in geochemistry. The range of topics is extended by geochemical processes, material cycles and the application in isotope geochemistry. In the respective courses, the important role of microbial processes on geochemical cycles and their associated isotope effects are illustrated. The lectures are complemented by practical exercises.
1k	learning outcomes/ competencies/ targeted competencies	1) The students will understand the basic methods and applications of radioactive and stable isotopes in Earth and Ocean Sciences 2) Students will have solid knowledge of the isotope geochemical methods to reconstruct environmental changes

		3) Students will have an understanding of the gas composition in the atmosphere, the hydrological cycle or processes in the ocean and sediments 4) Students will have a sound knowledge of transport and reaction processes like diffusion, advection, formation and degradation of organic matter or the release of fluids and gases from the seabed
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

Presence time: 5 SWS (70 h) and

Working hours: 0 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 70.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Hoefs, J., "Stable Isotope Geochemistry" Springer 2) Dickin A.P., "Radiogenic Isotope Geology" Cambridge University Press 3) Schulz, H.D. and Zabel, M., "Marine Geochemistry" Springer
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GI1 /Research Data Management and Analysis

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GI1
1b	module title *(German title)*	Research Data Management and Analysis
1c	module title *(English title)*	Research Data Management and Analysis
1d	credit points	6
1e	responsible for the module	Glöckner, Frank Oliver
1f	type of module	compulsory elective module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Computer Course: Python
1j	learning contents	Fundamentals of research data management, bringing order into data collection, documentation, storage and use, including basic concepts of metadata description. Finding and accessing research data from multidisciplinary data sources. Use of scientific data portals, metadata-supported search. Introduction into domain specific scientific data formats, standards and terminologies (e.g. ontologies). Reuse of research data with Python: loading data into data frames, getting an overview on the data, data cleaning, exploration and preparation.

		Basic and advanced statistics with Python using PANGAEA data. Distribution analysis, missing data treatment, outlier detection. Applied data analytics, regression analysis, trends, smoothing. Basic plotting of data using Python.
1k	learning outcomes/ competencies/ targeted competencies	Students are acquainted to the data life-cycle and the FAIR data principles. Students are introduced to methods to manage, submit and archive research data in relevant information systems. Students will learn how to understand and select appropriate ontologies and community standards. Students are introduced to methods for data handling, data exploration, data analysis and statistics with Python.
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	1	SWS/ contact hours	14	hours of presence time
☑	1	seminar(s) with	1	SWS/ contact hours	14	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

		= sum of presence time and working hours: Presence time: 4 SWS (56 h) and Working hours: 0 h = total 56.0 hours
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 64.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 60.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	Literature list will be provided in the course
1r	more information on the module (*optional*)	

2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-PO1 /Paleoceanography and Environmental Change

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PO1
1b	module title *(German title)*	Paleoceanography and Environmental Change
1c	module title *(English title)*	Paleoceanography and Environmental Change
1d	credit points	6
1e	responsible for the module	Pälike, Heiko
1f	type of module	compulsory elective module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	This module provides the fundamentals for understanding the states and processes of the ocean and the climate in the geological past. The following topics are covered: The role of the ocean in the climate system - Archives and proxies of paleoceanography - The complex delta18O signal - Reconstructions of the surface layer, the deep and groundwater masses - Paleoproductivity - Reconstruction of ocean circulation - Continental climate changes from marine archives - Changes of ocean and climate on orbital timescales since then Pliocene - Climate and ocean during the last glacial maximum - Changes in ocean and climate on time scales from decades to millennia

1k	learning outcomes/ competencies/ targeted competencies	Learn methods to reconstruct earlier oceanic states and changes from proxy records Understand how has the ocean changed in the course of geological history Learn about questions currently being pursued in paleoceanography, and the limits of our knowledge Learn about consequences for understanding future climate change
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1,5	lecture(s) with	3	SWS/ contact hours	42	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 84.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	will be announced during the lectures
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BGW-EG1 /Marine Geophysics

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BGW-EG1
1b	module title *(German title)*	Marine Geophysics
1c	module title *(English title)*	Marine Geophysics
1d	credit points	6
1e	responsible for the module	Schwenk, Tilmann
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Grundlagen Angewandte Geophysik / Principles of Applied Geophysics
1j	learning contents	Within this module the broad spectrum of marine geophysical measurements and the interpretation of data in marine geological context will be taught. Contents of the course are the technical basics of data aquisition in the fields of navigation, bathymetry, side-scan sonar, multichannel seismic (reflection and refraction), marine magnetics and gravimetry. Data examples from recent research will be introduced, and analysis of the data will be trained. Taught principles will be applied in exercises during the course and at home. The students will present the results of an interpretation of a small data package as scientific poster.
1k	learning outcomes/ competencies/ targeted competencies	1) know the technical basics of marine geophysical measurements 2) analyse and describe marine geophysical data using the correct terminology

		3) interpret marine geophysical data in a marine geological context 4) create and present a poster
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,3	lecture(s) with	1,3	SWS/ contact hours	18,67	hours of presence time
☑	0,3	seminar(s) with	0,3	SWS/ contact hours	18,67	hours of presence time
☑	0,3	exercise(s) with	1,3	SWS/ contact hours	18,67	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 28.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 96.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Fundamentals of geophysics / William Lowrie¸ Cambridge Univ. Press 2) Applied geophysics / W. M. Telford / L. P. Geldart / R. E. Sheriff, Cambridge Univ. Press 3) Acquisition and processing of marine seismic data / D. Dondurur, Elsevier 2018, 4) Marine geophysics / E. J. W. Jones, Wiley
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % assignment PL 2: 50 % poster PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☑ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☑ Other (concrete definition is given in the examination regulations): poster
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BGW-GD1 /Geodynamic and Plate Tectonic Principles

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BGW-GD1
1b	module title *(German title)*	Geodynamic and Plate Tectonic Principles
1c	module title *(English title)*	Geodynamic and Plate Tectonic Principles
1d	credit points	6
1e	responsible for the module	Gohl, Karsten
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Principles of Physics, Tectonics and Applied Geophysics
1j	learning contents	This modul teaches the geodynamic and geophysical fundamentals of plate-kinematic and plate-tectonic processes on Earth. This includes an understanding of the major geodynamic cycles from crustal generation at divergent plate boundaries of oceanic and continental rifts to crustal accretion and subduction at convergent plate boundaries, including the underlying driving mechanisms and forces. All components of this cycle will be investigated by assessing geophysical evidence. The students will learn about the geometrical principles of plate-kinematics and apply these in practical exercises. They will learn to visualize, apply and test plate reconstructions by using the software GPlates. In addition to the lecture and exercises, the students will select individual project topics to focus on particular regions or geodynamic processes of interest and will present an oral and written report.

1k	learning outcomes/ competencies/ targeted competencies	1) understand fundamental geodynamic processes from Earth´s core to crust 2) apply plate-kinematic principles for regional and global tectonic reconstructions 3) analyse geophysical evidence for tectonic plates types, plate boundaries and crustal characteristics from crustal generation to subduction 4) use specialized software (GPlates) to test existing and generate new plate-tectonic motion models
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,3	lecture(s) with	1,3	SWS/ contact hours	18,67	hours of presence time
☑	0,3	seminar(s) with	0,3	SWS/ contact hours	18,67	hours of presence time
☑	0,3	exercise(s) with	1,3	SWS/ contact hours	18,67	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 44.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 80.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total This module requires substantial time in addition to the formal course lecture for weekly exercises, software practising and preparation for the examination.
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Fowler, C.M.R. (2005). The Solid Earth. Cambridge University Press 2) Frisch, W. & Meschede, M. (2009). Plattentektonik: Kontinentverschiebung und Gebirgsbildung. Wissenschaftliche Buchgesellschaft (German and English versions) 3) Cox, A. & Hart, R.B. (1986). Plate tectonics: How it works. Blackwell 4) Lecture scripts und special publications made available in Stud.IP
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	

2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % Presentation with written elaboration PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☑ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GS2 /Professional Competences

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GS2
1b	module title *(German title)*	Professional Competences
1c	module title *(English title)*	Professional Competences
1d	credit points	6
1e	responsible for the module	Mörz, Tobias
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	The internship contributes to gain an insight into the extremely diverse professional world of geoscientists. Possible internship providers can be found in the industry (e.g. engineering offices, exploration companies, laboratories), the public sector (e.g. authorities, museums, research and educational institutions outside the University of Bremen), associations and NGOs. The six-week internship belongs to the elective module General Studies - Professional Practice and should be completed by the 5th semester. The students are looking and organizing for a suitable internship themselves. The internship representative (https://www.geo.uni-bremen.de/page.php?pageid=915&benutzer_ID=210&p_reg=2) of the department advises and clarifies with you in advance whether your selected internship choice can be recognized. He also

		signs the internship contract of the geoscience department 05. The contract is signed in triplicate: 1 copy for the internship representative 1 copy for the internship provider 1 copy for the student Successful completion of the internship is documented by a report of the internship and an internship certificate / activity report from the internship provider. Submit the report (s. guidelines) to the internship representative for examination. The internship contract, report and internship certificate/ activity report are forwarded to the examination office via the internship representative. Please provide paper copies. Details of the internship are regulated by the internship regulations LINK. A division of the internship time e.g. accompanying the semester is possible. Past relevant professional activities can also be recognized as an internship. The internship representative decides on the recognition. The internship is a good opportunity to gain experience abroad. You can get advice on international internships from the FB 5 practice office, the International Office and the Career Center. Please note the information and links. Students who want to do an internship of minimum two months in a European country can apply for a scholarship within the framework of ERASMUS +. This includes a monthly support of approx. € 300 as well as a subsidy for travel expenses and foreign language preparations. The PROMOS funding program is available for an internship outside Europe. The DAAD offers the Rise program with research internships in Canada and the USA for research enthusiastic students up to their 5th semester.
1k	learning outcomes/ competencies/ targeted competencies	Students have gained insight into possible fields of professional activity/employment after graduation.
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☐	0	lecture(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	internship(s) with	0	sum of working hours		

		☐		seminar(s) with		SWS/ contact hours	total hours of presence time
		☐ 0		laboratory/laboratories with	0	SWS/ contact hours 0	total hours of presence time
		☐ .		tutorial(s) with	0 / 0	SWS/ contact hours	
		☐		excursion(s) with		SWS contact hours in total	working hours
		☐ other form of course (e.g. block seminar), namely this:					
		with 0		SWS / with totaly	0	contact hours ☐ presence time	☐ working hours
		= sum of presence time and working hours: Presence time: 0 SWS (0 h) and Working hours: 0 h = total 0.0 hours					
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 0.0 hours					
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 0.0 hours					
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 0.0 hours presence time, 180 hours total 6 weeks internship (fulltime)					
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐					

1n	language(s) of instruction	☑ German ☑ Eng l i sh ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	to be announced by the internship supervisor of the company/authority
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☐ PL | 0 ☑ SL | 1 ☐ PVL | justification If necessary, further explanations: internship report
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: PL 2: PL 3: PL 4:

2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GS3 /Interdisciplinary skills

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GS3
1b	module title *(German title)*	Interdisciplinary skills
1c	module title *(English title)*	Interdisciplinary skills
1d	credit points	6
1e	responsible for the module	Ventura, Barbara
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	
1i	content-related prior knowledge or skills	
1j	learning contents	Within this module students have the option to choose individually and according to their own needs and interests interdisciplinary lectures from the General Studies pool of the University of Bremen. Typical lectures and courses include scientific methods, project-, time-, conflict- and career management, intercultural training, languages and vocational preparation. Further courses from the geoscientific study programs of the University of Bremen as well as unpaid tutoring as teaching assistant can be accepted upon previous agreement. Students are incouraged to ask for consultancy.

1k	learning outcomes/ competencies/ targeted competencies	Gained skills depend on individual choice of the students.

The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).

a) detailed calculation:

SWS / presence time/working hours in each course of the module

☐	0	lecture(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 0 SWS (0 h) and

Working hours: 0 h = total 0.0 hours

1l	calculation of student workload *(part a: calculation of presence time and working hours)*	
	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 0.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 0.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 0.0 hours presence time, 180 hours total Presence time-, self-study- and exam-workload depend on the specific courses chosen by the students.
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☑ General Studies courses of the University of Bremen, further courses and activities upon previus agreement
1n	language(s) of instruction	☑ German ☑ Engl i sh ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	Dependent on courses chosen by the students.
1r	more information on the module (*optional*)	Course type depends on courses chosen by the students (typically lecture, seminar, exercise). Alternative course formats are possible. A total of 6 CP must be reached.
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☐ PL | 0 ☑ SL | generally 3 ☐ PVL | justification

		If necessary, further explanations: SL (study performance): only ungraded study performances, the final number of study performances depends on the chosen courses and vary between 1 and 6.
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-SE2 /Deep-Sea Sedimentology

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-SE2
1b	module title *(German title)*	Deep-Sea Sedimentology
1c	module title *(English title)*	Deep-Sea Sedimentology
1d	credit points	6
1e	responsible for the module	Miramontes García, Elda
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	Continental margins and deep-sea basins are the largest zones of sediment accumulation in the world. Understanding the sedimentary processes involved in the transport of sediment from the continent to the deep sea has important implications for paleoclimatic and paleoceanographic reconstructions, biogeochemical cycles, ecosystem distribution, geohazards, infrastructure stability and hydrocarbon exploration. This module covers the description of the sedimentary processes and deposits that occur along continental margins and in the deep sea: deposits generated by gravity-driven processes (turbidites and submarine landslides), current-related deposits (contourites), pelagic and hemipelagic sedimentation, and cold water coral mounds. The students will learn to identify these types of deposits from different data sets (multibeam bathymetry, seismic data, sediment cores, well-logging and current measurements).

1k	learning outcomes/ competencies/ targeted competencies	1) Recognise deep-sea depositional systems and comprehend the processes that control their formation 2) Identify independently deep-water depositional systems and their evolution based on their sedimentation patterns 3) Understand the role of oceanographic and climatic conditions, ocean productivity and tectonics in deep-sea sedimentation 4) Interprete the type of deep-water sedimentary system based on the combination different data sets (seismic data, multibeam bathymetry, sediment cores and well logs)

1l calculation of student workload

(part a: calculation of presence time and working hours)

The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).

a) detailed calculation:

SWS / presence time/working hours in each course of the module

☑	1	lecture(s) with	3	SWS/ contact hours	42	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 64.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 60.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) PICKERING, K.T., HISCOTT, R.N. 2016. Deep marine systems: processes, deposits, environments, tectonics and sedimentation. Wiley, Chichester, 672 pp. 2) HSÜ, K.J. 2004. Physics of sedimentology. Springer, Berlin, 240 pp. 3) MURRAY, R., WHEELER, A., FREIWALD, A., CAIRNS, S. 2009. Cold-Water Corals: The Biology and Geology of Deep-Sea Coral Habitats. Cambridge University Press.

1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 80 % written exam PL 2: 20 % project exercise report PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☑ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-PA2 /Marine Micropaleontology

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PA2
1b	module title *(German title)*	Marine Micropaleontology
1c	module title *(English title)*	Marine Micropaleontology
1d	credit points	6
1e	responsible for the module	Kucera, Michal
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Courses "Evolutionary processes of Earth and Ocean" or "Entwicklungsprozesse der Erde"
1j	learning contents	The module provides an overview of the diversity and preservation of marine microfossils, the methods for their investigation and the biology and ecology of the organisms that produced them. Using practical examples, the applications of micropaleontology in industrial biostratigraphy as well as in (paleo) climate, (paleo) oceanography and (paleo) environmental research will be explored.
1k	learning outcomes/ competencies/ targeted competencies	1) Recognise, describe and identify microfossils in samples extracted from sediments 2) Understand the preservation of microfossils and apply appropriate methods to extract and visualise them 3) Understand applications of microfossils in industrial biostratigraphy and basin analysis

		4) Understand applications of microfossils in paleoclimatology and paleoceanography
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	2,5	SWS/ contact hours	35	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 5 SWS (70 h) and

Working hours: 0 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 70.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Armstrong, H. & Brasier, M.D. Microfossils. 2nd edition. Blackwell, 2004.
1r	more information on the module (*optional*)	The module consists of one course including 2 hours lecture and 2-3 hours exercises with microscope
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:

2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GI2 /Data Visualization

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GI2
1b	module title *(German title)*	Data Visualization
1c	module title *(English title)*	Data Visualization
1d	credit points	6
1e	responsible for the module	Rovere, Alessio
1f	type of module	compulsory elective module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Modul 1
1j	learning contents	Introduction to basic principles and practises of data visualization. Theory: The basics of human abilities to understand graphics and data visualizations, and how to perform visual presentation of data emphasising scientific results (color maps, styles etc.). Application: Introduction and application of software tools to create 2D-plots and maps (e.g. excel or LibreOffice, python, GIS)
1k	learning outcomes/ competencies/ targeted competencies	Students are acquainted with the princples of data visualisation and design of graphics Students are well introduced to the basics in Geographic Information Systems and know how to create simple thematic GIS maps Students are qualified to plot 2D graphs with Excel or Libre Office, Python

		Students are trained to conduct time series plots and simple analyses
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	0,5	SWS/ contact hours	7	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1,5	exercise(s) with	3,5	SWS/ contact hours	49	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 64.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 60.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Literature list will be provided
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:

2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % presentation PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☑ Other (concrete definition is given in the examination regulations): presentation
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GC2 /Principles and Methods of Organic Geochemistry

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GC2
1b	module title *(German title)*	Principles and Methods of Organic Geochemistry
1c	module title *(English title)*	Principles and Methods of Organic Geochemistry
1d	credit points	6
1e	responsible for the module	Hinrichs, Kai-Uwe
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	
1i	content-related prior knowledge or skills	Participation in module "Geochemical Processes and Isotope Geochemistry"
1j	learning contents	Organic Geochemistry is the discipline concerned with organic matter in the geosphere, which regulates the cycling of elements on geological time scales and harbors informative molecular biomarkers. The module will deepen the knowledge in Organic Geochemistry based on contents provided in module "Chemical Principles of Geosciences II". It combines a lecture series and a comprehensive laboratory course incl. a seminar part in order to provide the students with theoretical knowledge on the composition of organic matter, the biomarker concept and trace analysis. The laboratory course is held as a two-week-long block after the lecture period.
1k	learning outcomes/ competencies/ targeted competencies	1) Participation in this course will enable students to describe depositional environments on the basis of organic geochemical indicators.

		2) During the laboratory course, students will learn how to analyze organic compounds in geological samples and document results. 3) They will acquire a sound knowledge of natural compounds and their changes in geological material across time and space. 4) Ultimately, this course will help students to understand the complex interrelations between Geoscience, Chemistry and Biology.
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☑	1	laboratory/laboratories with	4	SWS/ contact hours	56	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 6 SWS (84 h) and

Working hours: 0 h = total 84.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 56.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 84.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) "Introduction to Organic Geochemistry", 2005, Killops and Killops, Blackwell Publishing 2) "Echoes of Life", 2008, Gaines, Eglinton, Rullkötter.
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 34 % oral exam PL 2: 66 % internship report PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☑ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☑ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

Universität Bremen

module code / module title

05-BMG-PO2 /Paleoceanography - Core Lab or Field Studies

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PO2
1b	module title *(German title)*	Paleoceanography - Core Lab or Field Studies
1c	module title *(English title)*	Paleoceanography - Core Lab or Field Studies
1d	credit points	6
1e	responsible for the module	Bickert, Torsten
1f	type of module	compulsory elective module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	A one-week block course is offered to study paleoceanography in the past using suitable archives of ship expeditions or field campaigns. There should be an intense investigation of such archives with respect to core/outcrop description, analysis and interpretation. The archives will be chosen to be complementary to the case studies adressed in Modul Paleoceanography I.
1k	learning outcomes/ competencies/ targeted competencies	To get familiar with the lab or field work methodology. To be able to describe, analyse, and interprete suitable environmental archives. To embedd the own observations and results in a broad scientific context

		To work objective-oriented and problem-based individually as well as in a team
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☐	0	lecture(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Block Course 56.0 h working hours

with 4 SWS / with totaly 56 contact hours ☐ presence time ☑ working hours

= sum of presence time and working hours:

Presence time: 0 SWS (0 h) and

Working hours: 56 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 84.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	will be announced during the course
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % project exercise report PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☑ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BGW-EG2 /Material Properties and Structural Imaging

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BGW-EG2
1b	module title *(German title)*	Material Properties and Structural Imaging
1c	module title *(English title)*	Material Properties and Structural Imaging
1d	credit points	6
1e	responsible for the module	Spieß, Volkhard
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Marine Geophysics
1j	learning contents	The course introduces the basic physical properties of geomaterials, their measurement in the laboratory and in the borehole, so that this information can later be used to characterize rocks and to support seismic data interpretation. Exercise is carried out on typical scientific drilling datasets (e.g. IODP). The aim of the course is to introduce seismic data processing in theory and practice. Each participant processes his own seismic profiles (preferably from the ALKOR expedition) and interprets them with the help of additional information (regional drilling / CPTs or regional sediment physical data sets). Results are summarized in a report and evaluated as a module examination.

1k	learning outcomes/ competencies/ targeted competencies	1) material properties and the measurement in lab and borehole 2) handling scientific databases (JANUS, BRG LDEO) using web interfaces and Excel 3) seismic data processing (VISTA seismic data processing software) 4) seismic interpretationn (KINGDOM seismic data interpretation software)
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,3	lecture(s) with	0,7	SWS/ contact hours	9,33	hours of presence time
☑	0,3	seminar(s) with	0,3	SWS/ contact hours	9,33	hours of presence time
☑	0,3	exercise(s) with	0,7	SWS/ contact hours	9,33	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☑	1	laboratory/laboratories with	3	SWS/ contact hours	42	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 5 SWS (70 h) and

Working hours: 0 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 70.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	Will be provided during the course.
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations: assignment with two parts: 1) Processing of seismic data, interpretation, ground truthing 2) Sediment physics, rock physics, downhole logging, borehole geology
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % assignment PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☑ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BGW-GD2 /Seismology and Geomagnetism

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BGW-GD2
1b	module title *(German title)*	Seismology and Geomagnetism
1c	module title *(English title)*	Seismology and Geomagnetism
1d	credit points	6
1e	responsible for the module	Dobeneck, Tilo von
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Grundlagen Angewandte Geophysik / Principles of Applied Geophysics
1j	learning contents	The seismology course conveys the theory of seismic wavefields to derive their properties and propagation through the layered Earth. The source parameters of earthquakes (hypocentre, magnitude and source mechanisms) will be determined from seismograms. Seismic catalogues will be used to analyse seismicity in different geological regimes. The geomagnetism course first introduces discovery, phenomenology and usage of the geometry and temporal variation of the Earth´s magnetic field. We then develop a conceptual physical understanding of magnetohydrodynamic processes occuring in the Earth´s core, magnetosphere and ionosphere, in the sun and in the solar system.

1k	learning outcomes/ competencies/ targeted competencies	1) comprehend and apply the properties and the propagation of seismic wave fields emitted by earthquakes 2) locate the hypocentre of an earthquake, calculate its magnitude, determine the focal mechanism and use earthquake catalogues 3) understand the complex physical conditions and processes from the core to the magnetosphere and solar system that generate and permanently vary the geomagnetic field 4) measure and calculate main field geometry, perform magnetostratigraphic dating, and analyze geodynamo model results and short-term field variations (space weather)
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 84.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	winter semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Lowrie, 2007. Fundamentals of geophysics, Cambridge University Press 2) Stein and Wysession, 2003. An introduction to seismology, earthquakes, and earth structure, Blackwell Publishing 3) Merrill, McElhinny & McFadden, 1998. The Magnetic Field of the Earth - Paleomagnetism, the Core and the Deep Mantle, Academic Press

		4) Lecture scripts und special publications made available in Stud.IP
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations: Course work portfolio including figure & formula sheet on individual in-depth exam topic is presented at exam
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 70 % oral exam PL 2: 30 % Portfolio PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☑ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☑ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-SE3 /Sedimentary Processes

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-SE3
1b	module title *(German title)*	Sedimentary Processes
1c	module title *(English title)*	Sedimentary Processes
1d	credit points	6
1e	responsible for the module	Miramontes García, Elda
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	Understanding the mechanisms that generate sediment transport and deposition is necessary for predicting and modelling the evolution of sedimentary deposits. This module introduces the laws and equations used to calculate sediment resuspension, transport, deposition and settling velocity. It will also cover the formation of bedforms under different flow regimes, which will be observed in laboratory experiments. The students will apply the acquired theoretical knowledge about sediment processes during a cruise on a coastal reasearch vessel. They will collect, process and interpret the data acquired during the survey and write a report.

1k	learning outcomes/ competencies/ targeted competencies	1) Quantify sediment erosion, transport and deposition 2) Understand the formation of bedforms under different flow regimes 3) Acquire and process data for sediment dynamics studies on a research vessel 4) Write scientific reports
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Field Exercise 28.0 h working hours

with	2	SWS / with totaly	28	contact hours	☐ presence time	☑ working hours

= sum of presence time and working hours:

Presence time: 2 SWS (28 h) and

Working hours: 28 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 54.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 70.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) van Rijn, L.C., 1993. Principles of sediment transport in rivers, estuaries and coastal seas. Aqua Publications: Amsterdam. 715 pp 2) Open University, 1999. Waves, tides, and shallow-water processes, 2nd edition. Pergamon Press, in association with the Open University, Milton Keynes, England in Oxford, New York, 161pp 3) ALLEN, P.A. 1997. Earth Surface Processes. Blackwell Science (Oxford), 404 pp. 4) Masselink and Hughes, 2003. Introduction to coastal processes and geomorphology. Arnold, Hodder Headline Group London, 354pp
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	

2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % written exam PL 2: 50 % project exercise report PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☑ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-PA3 /Paleontological Methods

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PA3
1b	module title *(German title)*	Paleontological Methods
1c	module title *(English title)*	Paleontological Methods
1d	credit points	6
1e	responsible for the module	Kucera, Michal
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Basic Mathematics
1j	learning contents	Working in small groups, the students will obtain hands-on training in the application of methods needed to document paleontological findings, including sample preparation, visual documentation, description and identification of fossils. In the second part of the module, the students will obtain theoretical knowledge and practical training in key approaches to analysis of paleontological data, including univariate and multivariate analysis of population structure, morphometry and image analysis, analysis of spatial and oriented data, quantitative biostratigraphy and phylogenetic analysis.
1k	learning outcomes/ competencies/ targeted competencies	1) learn methods for preparation and visualisation of fossils and can apply them in practice 2) are able to identify, describe, and formally taxonomically treat fossil material

		3) can apply quantitative approaches to paleontological research and identify methods appropriate to different types of data 4) can acquire and analyse paleontological data independently and are able to critically evaluate the results of such analyses
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☑	1	laboratory/laboratories with	3	SWS/ contact hours	42	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with	0	SWS / with totaly	0	contact hours	☐ presence time	☐ working hours

= sum of presence time and working hours:

Presence time: 5 SWS (70 h) and

Working hours: 0 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 64.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 46.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Hammer, Ø. & Harper, D. (2006): Paleontological data analysis. – Blackwell Publishing. 2) MacLeod, N. (2011): Paleomath. http://www.morpho-tools.net/paleomath.html
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % internship report PL 2: 50 % assignment PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☑ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☑ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GI3 /Earth-System Modeling and Data Analysis

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-GI3
1b	module title *(German title)*	Earth-System Modeling and Data Analysis
1c	module title *(English title)*	Earth-System Modeling and Data Analysis
1d	credit points	6
1e	responsible for the module	Schulz, Michael
1f	type of module	compulsory elective module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Fundamentals of mathematics, physics and chemistry
1j	learning contents	Numerical models are widely used across all fields in Earth Sciences. This course introduces the basic concept of finite difference techniques for solving differential equations. The focus is on reservoir models that are applied, for example, in geochemistry, paleoceanography, or climatology. Computer labs using Python form the core of the course. In the second part, the students learn about the analysis of climate data stemming from 4-dimensional observations or climate models, i.e., gridded data in time and space.
1k	learning outcomes/ competencies/ targeted competencies	understanding key concepts and assumptions underlying numerical models basic understanding of discretization in space and time using finite differences

		ability to transfer modeling concept to simple geoscientific problems ability to analyse 4-dimensional climate data
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Block Course 28.0 h working hours

with 2 SWS / with totaly 28 contact hours ☐ presence time ☑ working hours

= sum of presence time and working hours:

Presence time: 2 SWS (28 h) and

Working hours: 28 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 56.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 68.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	Kendal McGuffie, Ann Henderson-Sellers: The Climate Modelling Primer, 4th Edition. Wiley-Blackwell, 456 pp., 2014. Hartmann, Dennis L.: Global Physical Climatology. Elsevier, 2nd edition, 498 pp., 2016.
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:

2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % written exam PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☑ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-GC3 /Applied Geochemistry

date / version of the module description	05.07.2021

1	**INFORMATION ON THE MODULE**	
1a	module code	05-BMG-GC3
1b	module title *(German title)*	Applied Geochemistry
1c	module title *(English title)*	Applied Geochemistry
1d	credit points	6
1e	responsible for the module	Zabel, Matthias
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Thorough knowledge of the contents of modules 1&2 Fundierte Kenntnisses der Inhalte der Module 1&2 (05-BMG-GC1 Geochemical Processes / 05-BMG-GC1 Isotope Geochemistry)
1j	learning contents	The content of this module serves the practical and theoretical implementation of the knowledge acquired in modules 1&2. An important learning objective is to look at concrete questions in their overall context in order to a) select or apply the most promising methods for successful processing and b) take into account potentially influencing boundary parameters when interpreting measurement data. The tasks are carried out in guided small groups.
1k	learning outcomes/ competencies/ targeted competencies	1) Conception of an own field study 2) Performance of this study in the field (sampling, first measurements)

		3) Laboratory experiments, analyses in the laboratory and - if possible - model-based recording of the results 4) Presentation, discussion and documentation of the results obtained
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☐	0	lecture(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Project Exercise 56.0 h working hours

with	4	SWS / with totaly	56	contact hours	☐ presence time	☑ working hours

= sum of presence time and working hours:

Presence time: 0 SWS (0 h) and

Working hours: 56 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 94.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 30.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	Other, namely this 1 semester plus block course
1q	Literature (*optional*)	1) Schulz, H.D. and Zabel, M., "Marine Geochemistry" Springer 2) Burdige, D.J., "Geochemistry of Marine Sediments" Princeton 3) Sarmiento, J.L. and Gruber, N., "Ocean Biogeochemical Dynamics"
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)

2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % Presentation with written elaboration PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☑ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

Universität Bremen

module code / module title

05-BMG-PO3 /From Past to Future Ocean Conditions

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-PO3
1b	module title *(German title)*	From Past to Future Ocean Conditions
1c	module title *(English title)*	From Past to Future Ocean Conditions
1d	credit points	6
1e	responsible for the module	Bickert, Torsten
1f	type of module	compulsory elective module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	
1j	learning contents	This module will cover current topics related to role of the ocean for climate change as well as the use of the sea by humans and their consequences. An intense discussion on themes of the future ocean and on Global Change consequences related to e.g. modern ocean acidification and warming will be triggered from actual scientific knowledge (e.g. IPCC, SRU, etc.).
1k	learning outcomes/ competencies/ targeted competencies	To get familiar with current topcis on climate change and its consequences To be able to critically evaluate reports on climate change To communicate the consequences of climate change

		To work objective-oriented and problem-based individually as well as in a team
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	1	SWS/ contact hours	14	hours of presence time
☑	1	seminar(s) with	1	SWS/ contact hours	28	hours of presence time
☑	0,5	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 84.0 hours

	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ Eng l i sh ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	will be announced during the courses
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:

2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % Presentation with written elaboration PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☑ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BGW-EG3 /Magnetic Exploration

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BGW-EG3
1b	module title *(German title)*	Magnetic Exploration
1c	module title *(English title)*	Magnetic Exploration
1d	credit points	6
1e	responsible for the module	Dobeneck, Tilo von
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Grundlagen Angewandte Geophysik / Principles of Applied Geophysics
1j	learning contents	This module covers all aspects required to understand, measure and interpret magnetic anomalies of the geological subsurface: magnetic potential theory, rock magnetism, aero- and ground magnetic methods, computerized processing and 2D/3D forward modelling of magnetic survey data. We start out in the field with a four-day survey of largely uncharted basalt dikes in Lower Franconia applying Overhauser magnetometry, susceptometry, GPS geodesy and field geology. Back in Bremen, course participants are first familiarized with essential fundamentals, computational methods and specialized software (Geosoft Oasis Montaj), before they process, visualize and investigate their own survey data.

1k	learning outcomes/ competencies/ targeted competencies	1) realize, consider and predict, how subsurface materials and structures, geomagnetic settings and magnetic field geometry contribute to observed magnetic anomaly patterns 2) have an insight into the applications, prospects and limitations of magnetic exploration in structural geology, mineral resource exploration, archeology and UXO detection 3) plan and execute problem-specific ground magnetic survey campaigns in complex geological terrain by skillfully combining divers magnetic and gedodetic instrumentation 4) process, visualize, analyze, evaluate and report magnetic survey datasets with competent use of state-of-the-art processing and modelling techniques and software packages
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	0,5	lecture(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	0,5	exercise(s) with	1	SWS/ contact hours	14	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☑ other form of course (e.g. block seminar), namely this:

Field Exercise 42.0 h working hours

with	3	SWS / with totaly	42	contact hours	☐ presence time	☑ working hours

= sum of presence time and working hours:

Presence time: 2 SWS (28 h) and

Working hours: 42 h = total 70.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 30.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 80.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 70.0 hours presence time, 180.0 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Gravity and Magnetic Exploration, W.J. Hinze, R.R.B. von Frese & A.H. Saad, Cambridge Press, 512 S. 2) Applied Geophysics, W.M. Telford, L.P. Geldart & R.E. Sheriff, Cambridge University Press, 770 S. 3) Powerpoint scripts und special publications made available in Stud.IP

		4) Die Haßberge und ihr Vorland, G. Geyer & H. Schmidt-Kaler, Verlag Dr. Friedrich Pfeil, 128 S.
1r	more information on the module (*optional*)	An obligatory preceding ground magnetic survey campaign in Haßberge (Lower Franconia) is scheduled during 4 days (+ 2 days for travel and logistics) in every early-mid March
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	
2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 1 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations: Team report with individualized tasks and chapters covering survey results, data processing and structural interpretation
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 100 % project exercise report PL 2: PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☑ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BGW-GD3 /Geodynamic Modelling

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BGW-GD3
1b	module title *(German title)*	Geodynamic Modelling
1c	module title *(English title)*	Geodynamic Modelling
1d	credit points	6
1e	responsible for the module	Huhn-Frehers, Katrin
1f	type of module	compulsory elective module
1g	programs using the module	Bachelor Geowissenschaften 2021
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	Grundlagen Angewandte Geophysik / Principles of Applied Geophysics
1j	learning contents	The Geodynamic Modelling module provides basic knowledge in the field of numerical process simulation techniques. Major aim is an introduction into different numerical approaches: granular modelling techniques, e.g. the Discrete Element Methode, and continuum methods, e.g. the Finite Elements Method. This theoretical knowledge will be applied to investigate the deformation processes and mechanics of forearc regions at active margins particularly subduction zones and rifted margins
1k	learning outcomes/ competencies/ targeted competencies	1) know the basic concepts of modelling philosophy and understand how to build a model 2) comprehend and apply granular simulation techniques / e.g. Discrete Element Method using software packages, e.g. PFC©ITASCA

		3) understand the fundamentals of finite element modelling (FEM) 4) can develop independently a FEM model using MATLAB
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☑	1	lecture(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☑	1	exercise(s) with	2	SWS/ contact hours	28	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 4 SWS (56 h) and

Working hours: 0 h = total 56.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 60.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 64.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 56.0 hours presence time, 180 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	1) Turcotte, D. L. & G. Schubert (2002): Geodynamics: Applications of Continuums Physics to Geological Problems. John Wiley and Sons, New York 2) Pöschel, T. (2001) Dynamics of granular systems / Logos, Berlin 3) Zienkiewicz, The finite element method: its basis and fundamentals 4) Gerya: Introduction to numerical geodynamic modelling
1r	more information on the module (*optional*)	
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	

2a	type of examination	☐ module exam; i.e. exam with only one component (MP) ☑ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 50 % presentation PL 2: 50 % presentation PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☐ Bachelor Thesis ☐ Internship report ☐ Colloquium ☐ Master Thesis ☑ Other (concrete definition is given in the examination regulations): presentation
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:

module code / module title

05-BMG-BT1 /Bachelor Thesis Module

date / version of the module description	05.07.2021

1	INFORMATION ON THE MODULE	
1a	module code	05-BMG-BT1
1b	module title *(German title)*	Bachelor Thesis Module
1c	module title *(English title)*	Bachelor Thesis Module
1d	credit points	12
1e	responsible for the module	
1f	type of module	compulsory module
1g	programs using the module	
1h	organizational unit offering the module	Faculty 05: Geosciences
1i	content-related prior knowledge or skills	The student has achieved at least 120 CP before beginning the Bachelor Thesis
1j	learning contents	During the last year of their Bachelor, students start to develop a topic for their Bachelor Thesis, usually in close collaboration with a working group at the Department of Geosciences or with one of the cooperating research institutes like AWI or MARUM. The Bachelor Thesis summarizes the results of a marine geoscientific project that students carry out under the guidance of a supervisor. The Thesis can deal with field-studies or laboratory experiments as well as with external projects, for example in cooperation with industry partners. Integral parts of the thesis are literature research, data collection and interpretation and a written scientific report. The students present and defend their work in a 45-minutes colloquium.

1k	learning outcomes/ competencies/ targeted competencies	1) The student can develop a geoscientific question in form of a project under the guidance of a supervisor 2) The student indipendently performs the typical processes of a scientific work, like literature research, data collection and -interpretation 3) The student can present, summarize and discuss her/his work clearly in written form considering the criteria of good scientific practice 4) The student can present scientifically and defend her/his results in a 45 minutes colloquium
1l	calculation of student workload *(part a: calculation of presence time and working hours)*	**The total amount of the presence time and working hours of the module has to be calculated additionally in the detailed calculation a) to c).** **a)** detailed calculation: **SWS / presence time/working hours in each course of the module**

☐	0	lecture(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	seminar(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	exercise(s) with	0	SWS/ contact hours	0	hours of presence time
☐	0	internship(s) with	0	sum of working hours		
☐		seminar(s) with		SWS/ contact hours		total hours of presence time
☐	0	laboratory/laboratories with	0	SWS/ contact hours	0	total hours of presence time
☐	.	tutorial(s) with	0 / 0	SWS/ contact hours		
☐		excursion(s) with		SWS contact hours in total		working hours

☐ other form of course (e.g. block seminar), namely this:

with 0 SWS / with totaly 0 contact hours ☐ presence time ☐ working hours

= sum of presence time and working hours:

Presence time: 0 SWS (0 h) and

Working hours: 0 h = total 0.0 hours

	calculation of student workload *(part b: preparation time and follow-up work/self-study)*	**b) working hours for preparation/follow-up work of the course(s) and/or self-study** = sum of working hours: 320.0 hours
	calculation of student workload *(part c: exam preparation etc.)*	**c) exam preparation (incl. examination)** = sum of working hours: 40.0 hours
	calculation of student workload *(total amount of hours including a) - c))*	**Total amount of the presence time and working hours a) to c):** 0.0 hours presence time, 360 hours total
1m	description of possible optional courses in the module	*Can a student choose between different courses within the module?* ☐
1n	language(s) of instruction	☐ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this:
1o	frequency	summer semester yearly
1p	duration	one semester module
1q	Literature (*optional*)	Dependent on the topic of the thesis.
1r	more information on the module (*optional*)	Students have 9 weeks to complete their Bachelor Thesis. An extension of 3 weeks is possible only once upon previous application. Students must register their Thesis at the examination office 2 weeks before beginning. They find autonomously 2 examiners. Students are responsible to submit 3 printed and 1 digital copies of their Thesis (2 for the examiners, 1 print and 1 digital copy for the archive). The reports of the examiners are available after max. 3 weeks. Students arrange a date for the colloquium with both examiners and inform the examination office 2 weeks in advance. Students bring to the colloquium the minutes-form from the examination office. In case of a failed Bachelor Thesis Module, the Bachelor Thesis can be repeated once with a different topic. For further details please see the following documents: Registration Bachelor Thesis, Examiners rules Bachelor Thesis, Guidelines Bachelor Thesis, Evaluation sheet Bachelor Thesis, Declaration AT-BPO, Application Bachelor colloquium.
2	**INFORMATION ON THE MODULE EXAMINATION** (see also AT Art. 5 section 8)	

2a	type of examination	☑ module exam; i.e. exam with only one component (MP) ☐ combination exam, i.e. exam with several components (administered by instructors) (KP) ☐ partial exam; i.e. exam with several components (administered by registrar) (TP)
2b	exam components or prerequisites *(type, number)*	***PL*** *= graded component of the examination* ***SL*** *= ungraded component of the examination, coursework* ***PVL*** *= prerequisite of the examination (see AT Art. 5 Section 10)* ☑ PL | 2 ☐ SL | 0 ☐ PVL | justification If necessary, further explanations:
2c	Give this information for combination examinations only: Weights (in percentage) of component grades	PL 1: 75 % bachelor thesis PL 2: 25 % colloquium PL 3: PL 4:
2d	form of examination (see AT BPO/AT MPO Art. 8, 9 and 10)	☐ Assignment ☐ Oral examination (single) ☐ Presentation, oral ☐ Written examination ☐ Group examination, oral ☐ Presentation and written assignment ☐ Portfolio ☐ Project report ☑ Bachelor Thesis ☐ Internship report ☑ Colloquium ☐ Master Thesis ☐ Other (concrete definition is given in the examination regulations):
2e	language(s) of instruction	☑ German ☑ English ☐ Spanish ☐ French ☐ Other, namely this: