

Module description

for the degree programme

Master of Science Physical
Geography: Climate &
Environmental Sciences

(Version of examination regulation: 20202)

for the winter term 2025/2026

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1	Module name 46001	Scientific Working I Scientific working I	5 ECTS
2	Courses / lectures	PG Masterseminar: Scientific Writing and Communication (SW I) (2 SWS)	5 ECTS
3	Lecturers	Prof. Dr. Thomas Mölg Samuel Cook	

4	Module coordinator	Prof. Dr. Matthias Braun Prof. Dr. Thomas Mölg
5	Contents	Seminar: • Introduction and analysis of different publication standards • Introduction and analysis of different research processes • Scientific writing of papers and proposals • Transfer of knowledge and science communication. • Presentation techniques
6	Learning objectives and skills	The students • analyse different scientific designs of publications with a focus on structure, quality standards, and their placement within the academic system • learn the ethical principles of science and good scientific practice • analyse different forms and structures of proposals • learn different ways of transferring scientific knowledge to practice • learn standards of communicating scientific facts to the media and public
7	Prerequisites	n/s
8	Integration in curriculum	semester: 1;2
9	Module compatibility	Pflichtmodul Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Method of examination	Seminar achievement Three exercise tasks
11	Grading procedure	Seminar achievement (pass/fail) Pass/fail
12	Module frequency	Only in winter semester
13	Workload in clock hours	Contact hours: 30 h Independent study: 120 h
14	Module duration	1 semester
15	Teaching and examination language	english
16	Bibliography	To be announced at the beginning of the term.

1	Module name 46003	Scientific Working II	5 ECTS
2	Courses / lectures	PG Masterseminar: Introduction to Climate & Environmental Sciences (SW II) (2 SWS)	5 ECTS
3	Lecturers	Samuel Cook Dr. Thorsten Seehaus Prof. Dr. Achim Bräuning Prof. Dr. Rupert Bäumler Prof. Dr. Thomas Mölg	

4	Module coordinator	Prof. Dr. Matthias Braun Prof. Dr. Thomas Mölg
5	Contents	Graduate seminar: In-depth study of selected, research-oriented topics in climate and environmental science
6	Learning objectives and skills	The students - evaluate the importance of the selected topics in climate and environmental research - develop a practice-oriented awareness for processes which have the potential to change society and environment - independently prepare and present a topic from climate and environmental science at high level, considering the trained standards of scientific working
7	Prerequisites	n/s
8	Integration in curriculum	semester: 1;2
9	Module compatibility	Pflichtmodul Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Method of examination	Written examination (45 minutes)
11	Grading procedure	Written examination (100%)
12	Module frequency	Only in winter semester
13	Workload in clock hours	Contact hours: 30 h Independent study: 120 h
14	Module duration	1 semester
15	Teaching and examination language	english
16	Bibliography	To be announced at the beginning of the term.

1	Module name 1700	Inter-/Transdisciplinary Perspectives	10 ECTS
2	Courses / lectures	No courses / lectures available for this module!	
3	Lecturers	No lecturers available since there are no courses / lectures for this module!	

4	Module coordinator	
5	Contents	Supplement and extension of geographical topics from the perspectives of neighbouring disciplines (modules offered by FAU Faculty of Sciences and Faculty of Engineering)
6	Learning objectives and skills	The students: • gain deepened knowledge of actual interdisciplinary questions within the selected key areas • know and reflect corresponding theoretical and methodical approaches and are able to apply these approaches • are able to embed such approaches within the academic system • understand, analyse and illustrate processes of climate and environment in the context of the key areas of research at the Institute of Geography
7	Prerequisites	None
8	Integration in curriculum	no Integration in curriculum available!
9	Module compatibility	Pflichtmodul Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Method of examination	Variable Written Short test Oral (30 minutes) Written examination (45 minutes) Variable Written examination According to examination regulations of the elective modules
11	Grading procedure	Variable (pass/fail) Written (pass/fail) Short test (pass/fail) Oral (pass/fail) Written examination (pass/fail) Variable (pass/fail) Written examination (pass/fail) Non-graded examination (0%) Pass/fail
12	Module frequency	Every semester
13	Workload in clock hours	Contact hours: Compulsory course attendance and self-study in total 300 h; according to neighbouring disciplines Independent study: Compulsory course attendance and self-study in total 300 h; according to neighbouring disciplines

14	Module duration	1-2 semester
15	Teaching and examination language	german english
16	Bibliography	

1	Module name 46041	Advanced Physical Geography I Advanced physical geography I	5 ECTS
2	Courses / lectures	PG Masterseminar: Graduate Seminar Physical Geography I: Glacier Hydrology (2 SWS) PG Masterseminar: Graduate Seminar Physical Geography I: Climate Change and Hazards (2 SWS) Es besteht Anwesenheitspflicht.	5 ECTS 5 ECTS
3	Lecturers	Samuel Cook Tim Appelhans	

4	Module coordinator	Prof. Dr. Rupert Bäumler
5	Contents	In-depth study of selected, research-oriented topics in climate and environmental science.
6	Learning objectives and skills	The students • prepare the selected topics in climate and environmental research in written form according to the standards of scientific working by self-contained literature research focusing on primary literature • develop a practice-oriented awareness and critically reflect the contents of the selected topics • present and discuss the selected topic from climate and environmental science at high level, considering the trained standards of scientific working, and finally bring the different topics together to form an overall picture
7	Prerequisites	None
8	Integration in curriculum	semester: 1;2
9	Module compatibility	Pflichtmodul Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Method of examination	Seminar achievement Written paper (20-25 pages) with oral presentation (45 min.)
11	Grading procedure	Seminar achievement (100%) Written paper (50%), oral presentation (50%)
12	Module frequency	Every semester
13	Workload in clock hours	Contact hours: 30 h Independent study: 120 h
14	Module duration	1 semester
15	Teaching and examination language	english
16	Bibliography	To be announced at the beginning of the term.

1	Module name 46042	Advanced Physical Geography II Advanced physical geography II	5 ECTS
2	Courses / lectures	PG Masterseminar: Graduate Seminar Physical Geography I: Glacier Hydrology (2 SWS) PG Masterseminar: Graduate Seminar Physical Geography I: Climate Change and Hazards (2 SWS)	5 ECTS 5 ECTS
3	Lecturers	Samuel Cook Tim Appelhans	

4	Module coordinator	Prof. Dr. Achim Bräuning
5	Contents	In-depth study of selected, research-oriented topics in climate and environmental science from scientific literature.
6	Learning objectives and skills	The students • evaluate the importance of the selected topics in climate and environmental research • develop a practice-oriented awareness for implementing science-based knowledge about climate and environment in society • independently prepare and present a topic from climate and environmental science at high level, considering the trained standards of scientific working, and finally bring the different topics together to form an overall picture
7	Prerequisites	None
8	Integration in curriculum	semester: 2;3
9	Module compatibility	Pflichtmodul Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Method of examination	Seminar achievement Written paper (20-25 pages) with oral presentation (45 min.)
11	Grading procedure	Seminar achievement (100%) Written paper (50%), oral presentation (50%)
12	Module frequency	Every semester
13	Workload in clock hours	Contact hours: 30 h Independent study: 120 h
14	Module duration	1 semester
15	Teaching and examination language	english
16	Bibliography	To be announced at the beginning of the term.

1	Module name 46022	RTC: Research Training Course RTC: Research training course	15 ECTS
2	Courses / lectures	No courses / lectures available for this module! Es besteht Anwesenheitspflicht.	
3	Lecturers	No lecturers available since there are no courses / lectures for this module!	

4	Module coordinator	Prof. Dr. Rupert Bäumler Prof. Dr. Achim Bräuning
5	Contents	Design and implementation of a clearly defined research project of manageable size in time and content in accordance with and under guidance of the lecturers (course project); alternatively or in addition to it integration or participation in a current research project; herein taking over and independent processing of a defined scope.
6	Learning objectives and skills	The students • independently design and systematically transfer problem-oriented questions within clear targets • select suitable methods to empirically treat the selected set of themes • identify adequate theoretical approaches and place the own research topic within the theoretical approach • be aware of and organize the logical demands of research projects • present methods and results competent and understandable to experts and non-experts
7	Prerequisites	None
8	Integration in curriculum	semester: 2;3
9	Module compatibility	Pflichtmodul Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Method of examination	Presentation/written assignment Research report (20-50 pages) with oral presentation (30 min.)
11	Grading procedure	Presentation/written assignment (100%) Research report (70 %), oral presentation (30 %)
12	Module frequency	Every semester The module starts each summer term and continues in the following winter term. Summer term: 150 attendance, 150 self study Winter term: 30 attendance, 120 self study
13	Workload in clock hours	Contact hours: 180 h Independent study: 270 h
14	Module duration	2 semester
15	Teaching and examination language	english

16	Bibliography	To be introduced at the beginning of the course.
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1	Module name 46150	Field Course Field course	5 ECTS
2	Courses / lectures	No teaching units are offered for the module in the current semester. For further information on teaching units please contact the module managers.	
3	Lecturers	-	

4	Module coordinator	Prof. Dr. Matthias Braun
5	Contents	- Students will learn to handle different environmental measuring devices - Measurements will be performed for different application fields including ground truthing for remote sensing, vegetation ecology, meteorological and hydrological as well as soil measurements - Student will work in small groups in turns with different measuring devices - For each device, certain measuring tasks have to be performed
6	Learning objectives and skills	Students - familiarize themselves with different measuring instruments - understand different measuring principles - use appropriate measurement instruments for the particular research question and critically evaluate the performance of measurements - are able to critically evaluate measurements and measured values
7	Prerequisites	- Scientific working I & II (recommended) - Advanced Physical Geography I (recommended)
8	Integration in curriculum	semester: 2
9	Module compatibility	Pflichtmodul Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Method of examination	Tutorial achievement - Practical application of various physical-geographical methods in the field (test measurements and other surveys) - Data processing and analysis - Presentation of results (5 pages)
11	Grading procedure	Tutorial achievement (100%)
12	Module frequency	Only in summer semester
13	Workload in clock hours	Contact hours: 28 h Independent study: 122 h
14	Module duration	1 semester
15	Teaching and examination language	english
16	Bibliography	To be announced at the beginning of the term.

1	Module name 1999	Master's thesis (M.Sc. Physical Geography: Climate & Environmental Sciences 20202) Master's thesis	30 ECTS
2	Courses / lectures	No courses / lectures available for this module!	
3	Lecturers	No lecturers available since there are no courses / lectures for this module!	

4	Module coordinator	
5	Contents	Independent production of a substantial written scientific work within six months and its thesis defense
6	Learning objectives and skills	The students • design a relevant scientific scope and are in charge of independent elaboration within a defined period • develop independent ideas and concepts to solve the scientific questions • intensively and critically reflect concepts, models, theories, terminologies, characteristics, limitations and academically accepted views of the field of subject and science in general • are able to independently apply and develop appropriate methods – even for new or unknown and interdisciplinary contexts – and to present the results to experts • are able to clearly present subject-specific contents in written and oral form to target groups • extend their ability of planning and organization in order to realize subject-specific projects
7	Prerequisites	Successful graduation of modules of at least 60 ETCS credit points of the degree program
8	Integration in curriculum	semester: 4
9	Module compatibility	Pflichtmodul Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Method of examination	Oral (30 minutes) Written (6 Monate) Master Thesis (ca. 80 pages) and oral defense (ca. 30 Min.) Please consider to enroll your master thesis on time, if you intend to successfully finish the master program at the end of the current semester (Winter term: 31.3.; summer term: 30.9.) Please consider as well, that • the defense of the thesis has to be passed within a limit of four weeks after submission of the thesis, and that • date of the defense corresponds to the date of the final performance. It is on your one responsibility to take care about the subject of the thesis and to sort out all dates and deadlines with the supervisor of your master thesis in time; please also consider possible periods of absence of your supervisor during the semester break. Submission deadline should be latest one month before end of the respective semester.

11	Grading procedure	Oral (pass/fail) Written (100%) Master Thesis (200 %), oral defense (0 %)
12	Module frequency	Every semester
13	Resit examinations	The exams of this moduls can only be resit once.
14	Workload in clock hours	Contact hours: Attendance and self-study in total 900 h Independent study: Attendance and self-study in total 900 h
15	Module duration	1 semester
16	Teaching and examination language	english
17	Bibliography	In agreement with the supervisor

Elective Modules: Advanced Methods A + B (graded)

Elective Modules: Advanced Methods C (ungraded)

1	Modulbezeichnung 46061	Internship Alternative External Expertise	5 ECTS
2	Lehrveranstaltungen	Zu diesem Modul sind keine Lehrveranstaltungen oder Lehrveranstaltungsgruppen hinterlegt! Es besteht Anwesenheitspflicht.	
3	Lehrende	Zu diesem Modul sind keine Lehrveranstaltungen und somit auch keine Lehrenden hinterlegt!	

4	Modulverantwortliche/r	Prof. Dr. Rupert Bäumler
5	Inhalt	Work in non-university institutions such as public institutions, planning/ consulting offices, commercial enterprises, non-governmental organisations, etc. with a link to the content of the geography programme.
6	Lernziele und Kompetenzen	Students - Learn about potential professional fields in geography. - Apply theoretical knowledge gained during studies to practical questions in professional settings. - Develop important skills in self-organization and teamwork.
7	Voraussetzungen für die Teilnahme	The suitability of an internship position should be evaluated based on its proximity to the content of the degree programme. If there is any uncertainty, it is recommended to contact the internship coordinator in a timely manner. Additional information can be found on the institute's homepage.
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich 1. Internship certificate from the employer. 2. Internship report (3-5 pages) to be submitted to the internship supervisor no later than 8 weeks after the end of the internship. Additionally, the report should detail the intern's learning successes. The report should include a description of the activities carried out by the intern, as well as a brief presentation of any projects they worked on and how they were completed. - The report must include the full address of the internship organisation, the name of the contact person, and the signature of a representative of the organisation. Additionally, a certification stamp or similar must be included. - A declaration in lieu of an oath is also required.
11	Berechnung der Modulnote	schriftlich (bestanden/nicht bestanden) Successful participation
12	Turnus des Angebots	in jedem Semester

13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 120 h Eigenstudium: 30 h
14	Dauer des Moduls	min. 6 weeks Semester
15	Unterrichts- und Prüfungssprache	Deutsch oder Englisch
16	Literaturhinweise	

Consolidation Modules

- Emphasis on Climate Research

1	Modulbezeichnung 46080	Advanced Methods: Advanced Climate Data Analysis Advanced methods: Advanced climate data analysis	5 ECTS
2	Lehrveranstaltungen	PG Masterseminar: Advanced Methods MSc: Advanced Climate Data Analysis (2 SWS)	5 ECTS
3	Lehrende	Prof. Dr. Thomas Mölg	

4	Modulverantwortliche/r	Prof. Dr. Thomas Mölg
5	Inhalt	Selected methods related to the analysis of climate data & meteorological data
6	Lernziele und Kompetenzen	The students • understand the major principles of data availability and production; • practice different statistical methods for the problems at hand; • understand the importance of different space/time scales for the analysis and interpretation of climate data; • and are aware of the pitfalls of different types of climate data, which puts them in the position to make correct interpretations; A series of practical exercises builds on each other throughout the course. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	Keine
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Climate Research Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Climate Data Analysis, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Wintersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester
15	Unterrichts- und Prüfungssprache	Deutsch
16	Literaturhinweise	Will be provided at the beginning of the course

1	Modulbezeichnung 46085	Advanced Methods: Modeling Physical Systems in the Climate Advanced methods: Modeling physical systems in the climate	5 ECTS
2	Lehrveranstaltungen	Im aktuellen Semester werden keine Lehrveranstaltungen zu dem Modul angeboten. Für weitere Auskünfte zum Lehrveranstaltungsangebot kontaktieren Sie bitte die Modul-Verantwortlichen.	
3	Lehrende	-	

4	Modulverantwortliche/r	Prof. Dr. Thomas Mölg
5	Inhalt	Selected methods related to the numerical modeling of the climate system
6	Lernziele und Kompetenzen	The students • understand the major principles of climate modeling; • put emphasis on model evaluation and uncertainty, and therefore appreciate the role of in-situ measurements; • know the strengths and weaknesses of models for a correct interpretation of model results; • and understand the importance of different space/time scales for model formulations and limitations; A series of practical exercises builds on each other throughout the course. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	Keine
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Climate Research Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Modeling Physical Systems in the Climate, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Sommersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester

15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course

Consolidation Modules - Emphasis on Geoinformatics

1	Modulbezeichnung 46090	Advanced Methods: Scripting for Remote Sensing of the Environment Advanced methods: Scripting for remote sensing of the environment	5 ECTS
2	Lehrveranstaltungen	Zu diesem Modul sind keine Lehrveranstaltungen oder Lehrveranstaltungsgruppen hinterlegt!	
3	Lehrende	Zu diesem Modul sind keine Lehrveranstaltungen und somit auch keine Lehrenden hinterlegt!	

4	Modulverantwortliche/r	Prof. Dr. Matthias Braun
5	Inhalt	Selected methods related to the processing of Earth observation data
6	Lernziele und Kompetenzen	The students • understand the major principles of data availability and processing chains; • are able to prepare scripts towards an automated processing of Earth observation data; • know to customize and adopt existing algorithms for data processing; • understand advanced methods of data processing. A series of practical exercises builds on each other throughout the course. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	Keine
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Climate Research Master of Science Physical Geography: Climate & Environmental Sciences 20202 Consolidation Modules - Emphasis on Geoinformatics Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Scripting for Remote Sensing of the Environment, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Sommersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester

15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course

1	Modulbezeichnung 46110	Advanced Methods: Microwave Remote Sensing Advanced methods: Microwave remote sensing	5 ECTS
2	Lehrveranstaltungen	Zu diesem Modul sind keine Lehrveranstaltungen oder Lehrveranstaltungsgruppen hinterlegt!	
3	Lehrende	Zu diesem Modul sind keine Lehrveranstaltungen und somit auch keine Lehrenden hinterlegt!	

4	Modulverantwortliche/r	Prof. Dr. Matthias Braun
5	Inhalt	Selected methods related to microwave remote sensing
6	Lernziele und Kompetenzen	The students • understand the principles of microwave remote sensing; • are able to process microwave remote sensing data; • know to customize and adopt scripts for data processing. A series of practical exercises builds on each other throughout the course. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	Keine
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Geoinformatics Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Microwave Remote Sensing, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Sommersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester
15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course

1	Modulbezeichnung 46115	Advanced Methods: Scripting for GIS analysis Advanced methods: Scripting for GIS analysis	5 ECTS
2	Lehrveranstaltungen	PG Masterseminar: Advanced Methods MSc: Scripting for GIS Analysis (2 SWS)	5 ECTS
3	Lehrende	Dr. Sebastian Feick	

4	Modulverantwortliche/r	Prof. Dr. Matthias Braun
5	Inhalt	Automating Geographic Information System (GIS) workflows using a script language.
6	Lernziele und Kompetenzen	The students • have a deeper insight into GI-Systems. • are familiar with a free & open source programming language. • are able to use a script language to automate GIS workflows. A series of practical exercises builds on each other throughout the course. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	n/s
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Geoinformatics Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Scripting for GIS, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Wintersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester
15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course.

1	Modulbezeichnung 46099	AI in Physical Geography	5 ECTS
2	Lehrveranstaltungen	Im aktuellen Semester werden keine Lehrveranstaltungen zu dem Modul angeboten. Für weitere Auskünfte zum Lehrveranstaltungsangebot kontaktieren Sie bitte die Modul-Verantwortlichen. Course attendance is compulsory.	
3	Lehrende	-	

4	Modulverantwortliche/r	Samuel Cook
5	Inhalt	The principles and applications of machine-learning algorithms in the geosciences with a focus on practical use.
6	Lernziele und Kompetenzen	The students • understand the theoretical basis of machine-learning algorithms and when to apply them • know the existing uses of such algorithms within the geosciences • are able to develop and implement their own algorithms • are skilled in Python coding.
7	Voraussetzungen für die Teilnahme	Some pre-existing knowledge of Linux and Python will be an advantage.
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Climate Research Master of Science Physical Geography: Climate & Environmental Sciences 20202 Consolidation Modules - Emphasis on Geoinformatics Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	Variabel Weekly assignment (Problem-solving issues within the broader context of AI in Physical geography, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	Variabel (100%) Weekly assignments (100 %)
12	Turnus des Angebots	Unregelmäßig
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester
15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course.

Consolidation Modules - Environmental Analysis

1	Modulbezeichnung 46095	Advanced Methods: Tree-Ring Analysis - Applied Dendroecology Advanced methods: Tree-ring analysis - Applied dendroecology	5 ECTS
2	Lehrveranstaltungen	PG Masterseminar: Advanced Methods MSc: Tree Ring Analysis (2 SWS)	5 ECTS
3	Lehrende	Sugam Aryal	

4	Modulverantwortliche/r	Prof. Dr. Achim Bräuning
5	Inhalt	Selected methods related to the processing of tree-ring data
6	Lernziele und Kompetenzen	The students • understand the major principles of tree ring research, wood anatomy and wood formation; • are able to prepare wood samples for macroscopic and microscopic analyses; • know how to measure various wood parameters, to evaluate quality of measurements and to synchronize and date tree-ring data series; • learn how to relate tree-ring data to environmental variables • understand advanced methods of data processing. A series of practical exercises builds on each other throughout the course. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	Keine
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Climate Research Master of Science Physical Geography: Climate & Environmental Sciences 20202 Consolidation Modules - Environmental Analysis Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Tree-Ring Analysis, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Wintersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester

15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course.

1	Modulbezeichnung 46120	Advanced Methods: Remote Sensing: Spectroscopy and Analysis of Spectral Data Advanced methods: Remote sensing: Spectroscopy and analysis of spectral data	5 ECTS
2	Lehrveranstaltungen	PG Masterseminar: Advanced Methods MSc: Remote Sensing: Spectroscopy and Analysis of Spectral Data (2 SWS)	5 ECTS
3	Lehrende	Dakota Robin Pyles	

4	Modulverantwortliche/r	Prof. Dr. Matthias Braun
5	Inhalt	Selected methods related to the advanced analysis of spectroscopy data
6	Lernziele und Kompetenzen	The students • understand the major principles of spectroscopy for remote sensing; • practice different state-of-the-art methods for an analysis of spectroscopy data; • understand the applicability, limitations, and pitfalls of these methods; • know potential applications of spectral analyses to topics in physical geography. A series of practical exercises builds on each other throughout the course. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	Keine
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Geoinformatics Master of Science Physical Geography: Climate & Environmental Sciences 20202 Consolidation Modules - Environmental Analysis Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Spectroscopy and Analysis of Spectral Data, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Wintersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h

14	Dauer des Moduls	1 Semester
15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course

1	Modulbezeichnung 46125	Advanced Methods: Soil Science Advanced methods: Soil science	5 ECTS
2	Lehrveranstaltungen	PG Masterseminar: Advanced Methods MSc: Soil Science (2 SWS)	5 ECTS
3	Lehrende	Prof. Dr. Rupert Bäumler	

4	Modulverantwortliche/r	Prof. Dr. Rupert Bäumler
5	Inhalt	Application of sampling techniques, analytical methods and data interpretation in soil science
6	Lernziele und Kompetenzen	The students • understand the major principles of soil related questions in theory and practice (field methods and analytical techniques) • practice field sampling techniques, preparation of soil samples, and lab analyses of soil physical and chemical parameters • learn how to run quality controls of soil analytical data • learn how to interpret analytical data subject to research questions • learn how to relate soil data to environmental issues • understand applicability and limitations of the applied methods A series of practical exercises builds on each other throughout the course. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	n/s
8	Einpassung in Studienverlaufsplan	Semester: 3;2
9	Verwendbarkeit des Moduls	Consolidation Modules - Environmental Analysis Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Soil Science, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Wintersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester
15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course.

1	Modulbezeichnung 46130	Advanced Methods: Stable Isotope Analysis Advanced methods: Stable isotope analysis	5 ECTS
2	Lehrveranstaltungen	Im aktuellen Semester werden keine Lehrveranstaltungen zu dem Modul angeboten. Für weitere Auskünfte zum Lehrveranstaltungsangebot kontaktieren Sie bitte die Modul-Verantwortlichen.	
3	Lehrende	-	

4	Modulverantwortliche/r	Prof. Dr. Achim Bräuning
5	Inhalt	Applications of stable isotope methods related to environmental research
6	Lernziele und Kompetenzen	The students • understand the major principles of stable isotope theory and methodology; • practice sample preparation techniques for stable isotope analysis; • understand the applicability, limitations, and pitfalls of this technique; • know potential applications of stable isotope data to topics in physical geosciences. Practical exercises illustrate the applicability of the method. Results of these exercises will develop from individual contributions and small-group work, and from a discussion with the whole group. Course attendance is therefore compulsory.
7	Voraussetzungen für die Teilnahme	Keine
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Environmental Analysis Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods A + B (graded) Master of Science Physical Geography: Climate & Environmental Sciences 20202 Elective Modules: Advanced Methods C (ungraded) Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich Weekly assignment (Problem-solving issues within the broader context of Stable Isotope Analysis, max. 3 pages) or written paper (max. 15 pages)
11	Berechnung der Modulnote	schriftlich (100%) Weekly assignments (100 %)
12	Turnus des Angebots	nur im Wintersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 30 h Eigenstudium: 120 h
14	Dauer des Moduls	1 Semester

15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Will be provided at the beginning of the course

1	Modulbezeichnung 46076	Project Planning and Preparation Project planning and preparation	5 ECTS
2	Lehrveranstaltungen	Im aktuellen Semester werden keine Lehrveranstaltungen zu dem Modul angeboten. Für weitere Auskünfte zum Lehrveranstaltungsangebot kontaktieren Sie bitte die Modul-Verantwortlichen.	
3	Lehrende	-	

4	Modulverantwortliche/r	Prof. Dr. Thomas Mölg
5	Inhalt	The course is a guide to project planning in the context of specializing on a research field, which will lead to the topic of the Master's thesis. At least three visits of research colloquium talks complement the research-orientated nature of the course. Since the objectives rely on group discussions and coordination meetings, attendance is compulsory.
6	Lernziele und Kompetenzen	Students • identify their major field of interest in coordination with a lecturer of Physical Geography. • access the state of the art in this field from the peer-reviewed scientific literature. • engage in research discussions through participation in research colloquium talks. • apply the knowledge to design and plan their Master's thesis research project. • practice the scientific methods that will enable the implementation of the thesis project.
7	Voraussetzungen für die Teilnahme	• Scientific Working I & II (strongly recommended) • Advanced Physical Geography I & II (strongly recommended) • Inter-/Transdisciplinary Perspective (strongly recommended) • at least 10 ECTS credits in Advanced Methods (strongly recommended).
8	Einpassung in Studienverlaufsplan	Semester: 2;3
9	Verwendbarkeit des Moduls	Consolidation Modules - Emphasis on Climate Research Master of Science Physical Geography: Climate & Environmental Sciences 20202 Consolidation Modules - Emphasis on Geoinformatics Master of Science Physical Geography: Climate & Environmental Sciences 20202 Consolidation Modules - Environmental Analysis Master of Science Physical Geography: Climate & Environmental Sciences 20202
10	Studien- und Prüfungsleistungen	schriftlich/mündlich Research report, 20-50 pages (0%), and reflexive discussion, 15- 30 minutes (0%)
11	Berechnung der Modulnote	schriftlich/mündlich (bestanden/nicht bestanden)
12	Turnus des Angebots	nur im Wintersemester
13	Arbeitsaufwand in Zeitstunden	Präsenzzeit: 15 h Eigenstudium: 135 h

14	Dauer des Moduls	1 Semester
15	Unterrichts- und Prüfungssprache	Englisch
16	Literaturhinweise	Accompanying reading will be decided at the beginning of the module with regard to the specific research topic of the student.