Georg-August-Universität
Göttingen

Modulverzeichnis

Master's degree programme "Hydrogeology and Environmental Geoscience" - referring to: Prüfungs- und Studienordnung für den konsekutiven Master-Studiengang "Hydrogeology and Environmental Geoscience" (Amtliche Mitteilungen I 10/2011 p. 763, last revised through Amtliche Mitteilungen I 47/2016 p. 1201)

Module

Übersicht nach Modulgruppen

I. Master-Studiengang "Hydrogeology and Environmental Geoscience"

To successfully complete the Master's degree programme, a total of 120 C must be earned.

1. Fachstudium

The 12 following modules comprising 79 C have to be passed.

2. Professionalisierungsbereich Wahlpflichtmodule

One of the following modules comprising 5 C has to be passed.

3. Schlüsselkompetenzen

Licit modules comprising at least 6 C must be passed.

4. Masterarbeit

A total of 30 C are awarded for passing the Master's thesis.

II. Prüfungsformen

Soweit in diesem Modulverzeichnis Modulbeschreibungen in englischer Sprache veröffentlicht werden, gilt für die verwendeten Prüfungsformen nachfolgende Zuordnung:

- Oral examination = mündliche Prüfung [§ 15 Abs. 8 APO]
- Written examination = Klausur [§ 15 Abs. 9 APO]
- Term paper = Hausarbeit [§ 15 Abs. 11 APO]
- Oral Presentation = Präsentation [§ 15 Abs. 12 APO]
- Practical examination = Praktische Prüfung [§ 15 Abs. 13 APO]

APO = Allgemeinen Prüfungsordnung für Bachelor- und Master-Studiengänge sowie sonstige Studienangebote an der Universität Göttingen

Georg-August-Universität Göttingen **Modul M.HEG.11: General Tools** *English title: General Tools*	9 C 6 SWS

Lernziele/Kompetenzen: This module is designed to provide some of the basic prerequisites and general tools for the students to be able to follow the Master Course. The individual courses comprise fundamentals of mathematics required within the context of groundwater and systems modeling and a programming course. The course in Mathematics cannot replace an intensive study of the mathematical foundations for those with less mathematical background. The course Fundamentals of Geology is comprises a comprehensive review of the history of Earth, the main rock-forming processes, and changes of the Earth surface under atmospheric conditions.	**Arbeitsaufwand:** Präsenzzeit: 84 Stunden Selbststudium: 186 Stunden

Lehrveranstaltung: Scientific Programming (Vorlesung, Übung)	2 SWS
Prüfung: Praktische Prüfung, unbenotet **Prüfungsvorleistungen:** Regular participation. **Prüfungsanforderungen:** Computer programming in MATLAB. Evaluation and grading of theoretical and practical exercises 3-4 times during the course.	3 C

Lehrveranstaltung: Mathematics (Vorlesung, Übung)	2 SWS
Prüfung: Klausur (60 Minuten)	3 C

Lehrveranstaltung: Fundamentals of Geology (Vorlesung)	2 SWS

Prüfung: Klausur (60 Minuten)	3 C

Prüfungsanforderungen: Understanding of basic principles of mathematical procedures in natural sciences and information processing of spatial data.	

Zugangsvoraussetzungen: keine	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. Alfons M. van den Kerkhof Dr. Jannes Kordilla
Angebotshäufigkeit: jedes Wintersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 1
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.12: Hydrogeology I** *English title: Hydrogeology I*	8 C 6 SWS

Lernziele/Kompetenzen:	**Arbeitsaufwand:**
This module is intended to convey the fundamentals of the theory of groundwater flow and transport and to apply them in practical exercises in the field and in the laboratory. The students should be able to organise and conduct test procedures as well as to assess the specific hydrogeological site conditions. The contents of the module comprise the hydrological water balance, groundwater recharge estimation techniques, groundwater hydrology, pumping test evaluation and principles of solute transport. Relevance of this fundamental material is illustrated with examples from the hydrogeological practice, e.g. water resources exploration, and groundwater remediation. A field seminar will introduce the students into the most important field techniques of the daily practice of a hydrogeologist. During the “Advanced Hydrogeological Investigation Techniques” course, new assessment techniques for the hydraulic characterisation of aquifers are presented and demonstrated using practical examples. The advanced course on “Aquifersystems” will concentrate on the specifics of fractured aquifers and the particulars of the large variety of aquifer systems in Northern Germany. They can be regarded as representative for a large number of aquifer types.	Präsenzzeit: 84 Stunden Selbststudium: 156 Stunden

Lehrveranstaltungen:	
1. Introduction to Hydrogeology (Vorlesung, Übung)	3 SWS
2. Advanced Hydrogeological Investigation Techniques (Vorlesung)	1 SWS
3. Geology of Aquifer systems (Vorlesung, Exkursion)	1 SWS
4. Well Design and Construction (Vorlesung)	1 SWS
Prüfung: Klausur (60 Minuten)	8 C

Prüfungsanforderungen:	
Theory and practice of groundwater flow and solute transport processes, implementation in the field.	

Zugangsvoraussetzungen:	**Empfohlene Vorkenntnisse:**
keine	keine
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Jannes Kordilla Prof.Dr. Martin Sauter
Angebotshäufigkeit: jedes Wintersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 1
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.13: Hydrogeochemistry** *English title: Hydrogeochemistry*	6 C 5 SWS

Lernziele/Kompetenzen:	**Arbeitsaufwand:**
The module intends to convey an understanding for the role of chemical processes in water-rock interaction. The first lecture introduces the essential thermodynamics to understand basic and coupled electrolyte equilibria (i.e. redox processes, acid/base reactions, solubility, complexation, ion exchange) in the aquatic environment and is accompanied by simple and complex calculations of real world problems as well as coursework. The second lecture focuses on the classification of organic compounds and pollutants in the subsurface. Relevant properties are discussed together with property-structure-relationships. The environmental and subsurface behaviour of organic compounds is introduced in terms of relevant distribution equilibria and kinetically controlled processes. Complex examples are provided partially as coursework helping to apply gained knowledge. The isotope hydrology course is intended to provide the techniques to differentiate between different types of water of variable origins. Fundamentals of fractionation effects and the limitations of the methods are discussed.	Präsenzzeit: 70 Stunden Selbststudium: 110 Stunden

Lehrveranstaltungen:	
1. Inorganic Hydrogeochemistry (Vorlesung)	2 SWS
2. Organic Hydrogeochemistry (Vorlesung)	2 SWS
3. Exercise in Hydrogeochemistry (Übung)	1 SWS
Prüfung: Klausur (90 Minuten)	6 C

Prüfungsanforderungen:	
Knowledge about basic inorganic equilibrium water chemistry, water chemistry data interpretation, contaminant classes, basic organic chemistry, structure-properties relationships for organic compounds, distribution equilibria, isotope hydrology	

Zugangsvoraussetzungen:	**Empfohlene Vorkenntnisse:**
keine	Basic knowledge in chemistry
Sprache: Englisch	**Modulverantwortliche[r]:** PD Dr. rer. nat. Tobias Licha Prof. Dr. Martin Sauter
Angebotshäufigkeit: jedes Wintersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 1
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.14: Hydrology and GIS** *English title: Hydrology and GIS*	6 C 6 SWS

Lernziele/Kompetenzen:	**Arbeitsaufwand:**
"Applied Stataistics in Hydrogeology" focuses on probability and statistics in hydrology. Main topics are: descriptive statistics, regression and correlation, probability distribution, parameter estimation methods, statistical tests, frequency analysis and time series analysis. Examples and exercises on applied statistics in hydrology are provided. "Appllied Operation Research" focuses on methods applied to water resources management. The course introduces important approaches for optimization and uncertainty assessment: e.g. linear, non-linear, dynamic programming, fuzzy theory, multi-criteria decision analysis and multi-objective optimization. The lecture includes practical exercises in the field of water resources and environment. The second course gives an overview about the fundamentals of surface water hydrology. Main topics are: climate, hydrologic cycle, river basin characterisation, precipitation, surface runoff and river discharge, unsaturated zone assessment, evapotranspiration, river morphology, erosion and sediment transport, precipitationrunoff processes and modeling, water balance, surface water quality assessment, hydrometry, regionalization and hydrological mapping, open channel hydraulics and fundamentals of hydraulic modeling. The third course provides knowledge about GIS techniques (e.g. spatial data models, data input techniques, spatial analysis) applied in hydrologic, geological and environmental studies. Students gain practical skills by computer exercises with state of the art software.	Präsenzzeit: 84 Stunden Selbststudium: 96 Stunden

Lehrveranstaltungen:	
1. Introduction to Surface Hydrology (Vorlesung, Übung)	1 SWS
2. Surface Water Modeling (Vorlesung, Übung)	1 SWS
3. Urban Hydrology and Groundwater Management (Vorlesung, Übung)	1 SWS
Prüfung: Written examination to course 1 and 2 (45 Minuten) **Prüfungsvorleistungen:** Course 3: Term paper (max. 15 pages) **Prüfungsanforderungen:** Understanding of basic principles and application of state of the art methods in surface water and urban hydrology.	3 C

Lehrveranstaltungen:	
1. Geographic Information Systems (GIS) (Übung)	2 SWS
2. Applied Remote Sensing Techniques (Übung)	1 SWS
Prüfung: Presentation of the project work (approx. 10 min.) **Prüfungsanforderungen:** Practical application of GIS and Remote Sensing techniques on provided datasets.	3 C

Prüfungsanforderungen:	

Understanding of basic principles and application of state of the art methods in surface water hydrology and applied statistics.	

Zugangsvoraussetzungen: keine	**Empfohlene Vorkenntnisse:** Basic knowlegde in Geology, Computer Literacy, Cartography, Geography
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Bianca Wagner
Angebotshäufigkeit: jedes Wintersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 1
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.21: Hydrogeology II** *English title: Hydrogeology II*	8 C 6 SWS

Lernziele/Kompetenzen: This module builds on the foundations of „Hydrogeology I“ and concentrates on specific relevant fields. The first and second course focus on the understanding and modeling of processes, their interaction and weighting on groundwater catchment scale. Mass balances for sub systems and their individual impact on the whole mass balance for groundwater catchments are addressed. The third course will convey principles of field testing techniques employed in hydrogeology such as pumping tests, slug tests, tracer experiments, sampling as well as direct push investigation methods.	**Arbeitsaufwand:** Präsenzzeit: 84 Stunden Selbststudium: 156 Stunden

Lehrveranstaltungen:	
1. Catchment Hydrogeology (Vorlesung, Übung)	1 SWS
2. Hydrological and Hydrogeological Monitoring (Vorlesung, Übung)	1 SWS
3. Catchment Hydrogeology and Monitoring Field Seminar (Exkursion)	1 SWS
4. Fractured and Karstified Aquifers (Exkursion)	1 SWS
Prüfung: Klausur (60 Minuten) **Prüfungsvorleistungen:** Compulsory attendance in the Catchment Hydrogeology Field Seminar and the Fractured and Karstified Aquifers excursion	5 C

Lehrveranstaltung: Hydrogeological Field Seminar (Exkursion)	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** Compulsory attendance in the Hydrogeological Field Seminar	3 C

Prüfungsanforderungen: Theory of flow and transport processes on groundwater catchment scale, theory and practical application of hydrogeological characterisation techniques using field investigation methods.	

Zugangsvoraussetzungen: M.HEG.11, M.HEG.12	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr.-Ing. habil. Thomas Ptak-Fix
Angebotshäufigkeit: jedes Sommersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 2
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.22: Groundwater Modeling I** *English title: Groundwater Modeling I*	6 C 5 SWS

Lernziele/Kompetenzen: This module introduces the student to the commonly used mathematical tools as well as to state of-the-art numerical groundwater modeling techniques, including visualization of the results. Groundwater modeling allows a consistent assembly of multiple types of data from laboratory and field investigations, environmental system analysis, process understanding, planning of water management and remedial activities, risk assessment, decision making etc.. The first and second course focus on the numerical modeling of flow and non-reactive as well as reactive transport in porous media (aquifers). It includes topics such as model design, mathematical process formulation (process equations) and numerical methods for solving the governing equations. Simple modeling problems will be discussed and exercised by the students using computer codes in tutorials to complement the presentations given in the lecture. The third course deals with special advanced modeling techniques. The focus will be on basin scale integrated hydrosystem modeling, covering porous and fractured media, saturated and unsaturated zones, surface water - groundwater interaction, surface water modeling, hillslope hydrological aspects, including reactive contaminant transport. Students will gain hands on experience with models through computer exercises.	**Arbeitsaufwand:** Präsenzzeit: 70 Stunden Selbststudium: 110 Stunden

Lehrveranstaltungen:	
1. Groundwater Flow Modeling (Vorlesung, Übung)	2 SWS
2. Groundwater Transport Modeling (Vorlesung, Übung, Seminar)	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** Compulsory attendance in the exercises	5 C

Lehrveranstaltung: Advanced Modeling Techniques (Vorlesung, Übung)	1 SWS
Prüfung: Presentation of Course Work (approx. 15 min.), unbenotet **Prüfungsvorleistungen:** Compulsory attendance in the exercise	1 C

Prüfungsanforderungen: Knowledge about theoretic background and state of the art techniques in groundwater modelling, understanding of main concepts of integrated hydrosystem modelling and practical skills.	

Zugangsvoraussetzungen: M.HEG.11, M.HEG.12, M.HEG.13	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr.-Ing. habil. Thomas Ptak-Fix Prof. Dr. Martin Sauter
Angebotshäufigkeit:	**Dauer:**

jedes Sommersemester	1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 2
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.23: Geophysics** *English title: Geophysics*	6 C 4 SWS

Lernziele/Kompetenzen: In this module the students will learn to understand in how far the methods of Applied Geophysics can assist in the hydraulic characterisation of aquifers, the detection of different quality waters as well as general concepts of parameter regionalisation in three-dimensional space. The module is composed of a lecture, concentrating on the theory and the presentation of the basic techniques employed in Applied Geophysics, i.e. seismics, resistivity techniques, magnetics, gravimetry and borehole geophysics. Their relevance for hydrogeological problems is illustrated with examples. The field course builds on this foundation and demonstrates practical application of the various techniques in the field.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 124 Stunden

Lehrveranstaltung: Applied Geophysics and Hydrogeophysics (Vorlesung, Übung)	2 SWS
Prüfung: Klausur (90 Minuten)	3 C

Lehrveranstaltung: Geophysical Field Seminar (Exkursion)	2 SWS
Prüfung: Hausarbeit (max. 5 Seiten), unbenotet	3 C

Prüfungsanforderungen: Theory and practical application of applied geophysical methods in the solution of hydrogeological problems.	

Zugangsvoraussetzungen: keine	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Andreas Weller Prof. Dr. Martin Sauter
Angebotshäufigkeit: jedes Sommersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 2
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.24: Georeservoirs I - Processes and Characterization** *English title: Georeservoirs I - Processes and Characterization*	6 C 4 SWS

Lernziele/Kompetenzen: This module intends to convey a general understanding for the relevant processes and the general concepts involved in the exploitation of geothermal energy. The module is subdivided into “Deep Geothermics”, concentrating on power and heat production at large depths (> 4000m) “Shallow Geothermics”, dealing with heat extraction at shallow depths (< 500m), and the illustration of the use of geothermal energy with case studies. For the assessment and exploitation of geothermal energy, general knowledge of groundwater flow and transport is a prerequisite, provided in modules elsewhere. Course contents of this module comprise some basic principles, the regional assessment of the geothermal potential in Germany and Europe, required site conditions for economical exploitation, generally employed testing procedures, economical assessment methods, fractures and faults, fluid flow in fractured systems, stimulation methods.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 124 Stunden

Lehrveranstaltungen:	
1. Fluid flow, Mass and Heat Transport (Vorlesung, Übung)	2 SWS
2. Geochemistry and Geomechanics (Vorlesung, Übung)	2 SWS
Prüfung: Klausur (120 Minuten)	6 C

Prüfungsanforderungen: Prerequisites for the economical exploitation of shallow and deep geothermal energy, design of geothermal plants.	

Zugangsvoraussetzungen: M.HEG.11, M.HEG.12, M.HEG.13	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Bettina Wiegand Dr. Iulia Ghergut
Angebotshäufigkeit: jedes Sommersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 2
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.310: Groundwater Modeling II** *English title: Groundwater Modeling II*	8 C 5 SWS

Lernziele/Kompetenzen: The module “Georeservoirs II” deals with processes in georeservoirs (geothermal, energy storage, CO2-storage and hydrocarbons), their identification and quantification of process parameters. Processes in georeservoirs comprise hydraulic, thermal, mechanical and chemical processes as well as their coupling. The investigation of georeservoirs is one of the main research focuses in the Applied Geology and nowadays a highly relevant field in energy research issues. During the courses, the methods of the investigation, characterisation and modelling of georeservoirs shall be conveyed to the students, together with illustrations of practical examples of case studies. A field trip shall be conducted to geothermal plants and drilling sites.	**Arbeitsaufwand:** Präsenzzeit: 70 Stunden Selbststudium: 170 Stunden

Lehrveranstaltungen:	
1. Modeling of unsaturated Zone Processes (Vorlesung, Übung)	2 SWS
2. Simulation of Flow and Transport in Fractured and Karstified Aquifers (Vorlesung, Übung)	2 SWS
3. Reactive Transport Processes (Vorlesung, Übung)	1 SWS
Prüfung: Klausur (90 Minuten)	8 C

Prüfungsanforderungen: Prerequisites of the understanding of reservoir functioning and prediction of their future dynamics.	

Zugangsvoraussetzungen: M.HEG.11, M.HEG.12, M.HEG.22	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Jannes Kordilla
Angebotshäufigkeit: jedes Wintersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.320: Georeservoirs II - Environments and Applications** *English title: Georeservoirs II - Environments and Applications*	5 C 4 SWS

Lernziele/Kompetenzen: The module “Georeservoirs II” deals with processes in georeservoirs (geothermal, energy storage, CO2-storage and hydrocarbons), their identification and quantification of process parameters. Processes in georeservoirs comprise hydraulic, thermal, mechanical and chemical processes as well as their coupling. The investigation of georeservoirs is one of the main research focuses in the Applied Geology and nowadays a highly relevant field in energy research issues. During the courses, the methods of the investigation, characterisation and modelling of georeservoirs shall be conveyed to the students, together with illustrations of practical examples of case studies. A field trip shall be conducted to geothermal plants and drilling sites.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltungen:	
1. Deep Geothermics (Vorlesung, Übung)	2 SWS
2. Georeservoirs Engineering (Vorlesung, Übung)	2 SWS
Prüfung: Klausur (60 Minuten)	5 C

Prüfungsanforderungen: Prerequisites of the understanding of reservoir functioning and prediction of their future dynamics.	

Zugangsvoraussetzungen: M.HEG.12, M.HEG.22, M.HEG.24	**Empfohlene Vorkenntnisse:** Good knowledge of hydraulic and tracer test methods and insight into coupled THMC processes.
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Iulia Ghergut
Angebotshäufigkeit: jedes Wintersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.330: Advanced methods in Hydrogeology** *English title: Advanced methods in Hydrogeology*	8 C 5 SWS

Lernziele/Kompetenzen:	**Arbeitsaufwand:**
The first course focuses on innovative investigation and monitoring techniques. Both integral and high resolution point scale, non-invasive and invasive investigation techniques are presented, and scale-heterogeneity relationship issues are discussed. The second course addresses the problem of salinity in groundwater, characterisation, mapping, modelling and the management of groundwater resources in presence of salinity, including coastal aquifers and inland aquifers with saline water bodies. The third course provides knowledge about remote sensing techniques (e.g. remote sensing scanning techniques, image processing, interpretation) applied in hydrologic and environmental studies. Finally the module is supplemented with the basics of well construction and completion.	Präsenzzeit: 70 Stunden Selbststudium: 170 Stunden

Lehrveranstaltungen:	
1. Isotope Hydrology (Vorlesung, Übung)	2 SWS
2. Application of Indicators and Tracers (Vorlesung, Übung)	1 SWS
Prüfung: Klausur (90 Minuten)	5 C

Lehrveranstaltung: Investigation Techniques and Monitoring (Vorlesung, Übung)	2 SWS
Prüfung: Klausur (60 Minuten)	3 C

Prüfungsanforderungen:	
Investigation and monitoring techniques, seawater intrusion control, remote sensing techniques, basic principles of well construction.	

Zugangsvoraussetzungen:	**Empfohlene Vorkenntnisse:**
M.HEG.11, M.HEG.12, M.HEG.13, M.HEG.21, M.HEG.22	Basic knowledge in Hydrochemistry, Geology, Hydrogeology und Transport processes
Sprache: Englisch	**Modulverantwortliche[r]:** PD Dr. rer. nat. Tobias Licha Prof. Dr.-Ing Thomas Ptak-Fix
Angebotshäufigkeit: jedes Wintersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.340: Selected Topics in Hydrogeology** *English title: Selected Topics in Hydrogeology*	3 C 2 SWS

Lernziele/Kompetenzen:	**Arbeitsaufwand:**
Lecture topics vary depending on current innovative research trends in hydrogeology. Courses for example can include those given below: 1. Operations research applications in the field of integrated water resources management (IWRM). The lecture specifically treats: multi-criteria-analysis and multi-objective optimization procedures and their application to specific IWRM topics, such as irrigation planning and management, surface water reservoir planning and operation or Managed Aquifer Recharge. The application of decision support systems in IWRM is discussed, too. Social, political, legal and institutional aspects of IWRM, transboundary and conflict management are treated on an introductory level as well. A part of the course will be organized as seminar organized by the students. 2. The problem of salinity in groundwater, characterization, mapping, modelling and the management of groundwater resources in the presence of salinity, including coastal aquifers and inland aquifers with saline water bodies. The courses can be modified ad hoc to take into account current new topics and scientific methods or to integrate specialised expertise of visiting scientists.	Präsenzzeit: 28 Stunden Selbststudium: 62 Stunden

Lehrveranstaltungen:	
1. Operations Research in IWRM (Vorlesung, Übung)	1 SWS
2. Saline Groundwater (Vorlesung, Übung)	1 SWS
Prüfung: Klausur (60 Minuten)	3 C

Prüfungsanforderungen:	
Knowledge as presented in the course on selected topics in the field of integrated water resources management and salinity problems in groundwater.	

Zugangsvoraussetzungen: M.HEG.11, M.HEG.12, M.HEG.13	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Martin Sauter
Angebotshäufigkeit: jedes Wintersemester	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 25	

Georg-August-Universität Göttingen **Modul M.HEG.351: Planning, Working, Writing and Presenting in Science - Fundamentals of geology** *English title: Planning, Working, Writing and Presenting in Science - Fundamentals of geology*	5 C 4 SWS

Lernziele/Kompetenzen: The aim of this module is to introduce the students to the general workflow, writing and presenting in science. This comprises (1) how to obtain scientific data, (2) how to organize and summarize the relevant information in a report, and finally (3) how to prepare a clear and concise oral presentation of the report. Students can either choose an assigned project (laboratory/field work, programming/numerical modeling) or a literature research as a basis for their report and oral presentation. The topic of the report and presentation should be related to one of the respective lectures of the prerequisite module. Furthermore the students will have to participate in the weekly seminar of the Applied Geology department. This module focusses on geology and/or mineralogy. The skills acquired are expected to be invested into the preparation of the M.Sc. thesis.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltung: Literature Review or Assigned Project (Übung) *Inhalte*: The students will conduct either a literature study or an assigned project on a topic agreed with the supervisor. They will write a report and present their work in the seminar	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	3 C

Lehrveranstaltung: Presentation of Literature Review or Project Work (Seminar) *Inhalte*: This seminar will be organized during one semester. Besides their own presentation, the students are expected to participate also in the presentation of the other candidates.	1 SWS
Prüfung: Präsentation (ca. 20 Minuten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	2 C

Lehrveranstaltung: Applied Geology Seminar (Seminar) *Course frequency: each semester*	1 SWS

Prüfungsanforderungen: A literature review (report) or assigned project (report) on a geological topic, showing the competence of the student to independently process recent literature or conduct a short project study.	

Zugangsvoraussetzungen: M.HEG.11	**Empfohlene Vorkenntnisse:** Advanced knowledge of geology and/or mineralogy
Sprache:	**Modulverantwortliche[r]:**

Englisch	Dr. Alfons M. van den Kerkhof
Angebotshäufigkeit: jedes Wintersemester1	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 4	

Georg-August-Universität Göttingen **Modul M.HEG.352: Planning, Working, Writing and Presenting in Science - Fractured and Karstified Aquifers** *English title: Planning, Working, Writing and Presenting in Science - Fractured and Karstified Aquifers*	5 C 4 SWS

Lernziele/Kompetenzen: The aim of this module is to introduce the students to the general workflow, writing and presenting in science. This comprises (1) how to obtain scientific data, (2) how to organize and summarize the relevant information in a report, and finally (3) how to prepare a clear and concise oral presentation of the report. Students can either choose an assigned project (laboratory/field work, programming/numerical modeling) or a literature research as a basis for their report and oral presentation. The topic of the report and presentation should be related to one of the respective lectures of the prerequisite module. Furthermore the students will have to participate in the weekly seminar of the Applied Geology department. The module focusses on topics, related to the field of "Fractured and Karstified Rocks" and are concerned with the investigation, characterisation and modelling of groundwater flow and transport in these highly heterogeneous aquifers. Emphasis is mainly placed on water resources aspects and contaminant transport issues. The module is complemented with the discussion of case studies for the illustration of real world problems. The skills acquired are expected to be invested into the preparation of the M.Sc thesis.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltung: Literature Review or Assigned Project (Übung) *Inhalte*: The students will conduct either a literature study or an assigned project on a topic agreed with the supervisor. They will write a report and present their work in the seminar	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	3 C

Lehrveranstaltung: Presentation of Literature Review or Project Work (Seminar) *Inhalte*: This seminar will be organized during one semester. Besides their own presentation, the students are expected to participate also in the presentation of the other candidates.	1 SWS
Prüfung: Präsentation (ca. 20 Minuten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	2 C

Lehrveranstaltung: Applied Geology Seminar (Colloquium) (Seminar) *Course frequency: each semester*	1 SWS

Prüfungsanforderungen: Students are expected to have developed an understanding of the particular flow dynamics of fractured and karstified rocks as well as transport processes.	

Zugangsvoraussetzungen: M.HEG.12	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Martin Sauter
Angebotshäufigkeit: jedes Wintersemester1	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 4	

Georg-August-Universität Göttingen **Modul M.HEG.353: Planning, Working, Writing and Presenting in Science - Site Investigation and Modelling** *English title: Planning, Working, Writing and Presenting in Science - Site Investigation and Modelling*	5 C 4 SWS

Lernziele/Kompetenzen: The aim of this module is to introduce the students to the general workflow, writing and presenting in science. This comprises (1) how to obtain scientific data, (2) how to organize and summarize the relevant information in a report, and finally (3) how to prepare a clear and concise oral presentation of the report. Students can either choose an assigned project (laboratory/field work, programming/numerical modeling) or a literature research as a basis for their report and oral presentation. The topic of the report and presentation should be related to one of the respective lectures of the prerequisite module. Furthermore the students will have to participate in the weekly seminar of the Applied Geology department. The focus of this module is (i) on innovative subsurface investigation and monitoring techniques to characterize subsurface properties, groundwater flow and transport behavior etc., and (ii) on mathematical tools as well as state of-the-art high level process oriented numerical groundwater flow and transport modeling techniques, including geostatistical approaches and parameter optimization tools. Aspects of basin scale integrated hydrosystem modeling, climate change effects, saturated and unsaturated zones, surface water - groundwater interaction, saltwater intrusion, surface water modeling, hillslope hydrology, reactive contaminant transport, contamination backtracking, data fusion, parameter uncertainty and parameter inversion etc. will be covered. The students may compile a literature review report on one of the above topics, or the students will have to accomplish assigned project work on one of the above topics, and to prepare a professional report summarizing the given assignment and the achieved outcome. Project work may cover lab and/or field work, as well as numerical modeling, dealing with real world problems. The skills acquired are expected to be invested into the preparation of the M.Sc. thesis.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltung: Literature Review or Assigned Project (Übung) *Inhalte*: The students will conduct either a literature study or an assigned project on a topic agreed with the supervisor. They will write a report and present their work in the seminar	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	3 C

Lehrveranstaltung: Presentation of Literature Review or Project Work (Seminar) *Inhalte*: This seminar will be organized during one semester. Besides their own presentation, the students are expected to participate also in the presentation of the other candidates.	1 SWS
Prüfung: Präsentation (ca. 20 Minuten) **Prüfungsvorleistungen:**	2 C

12 participations in the weekly seminar of the Applied Geology department, certified.	

Lehrveranstaltung: Applied Geology Seminar (Colloquium) (Seminar) *Course frequency: each semester*	1 SWS

Prüfungsanforderungen: A literature review (report) or assigned project (report) in the area of site investigation and modeling, showing the competence of the student to independently find, understand, interpret and summarize existing and especially recent literature relevant with respect to one of the above topics, or to independently and successfully deal with an assigned high level project aiming at real world problems of site investigation and modeling. Participation in the seminar of the Applied Geology Department.	

Zugangsvoraussetzungen: M.HEG.11	**Empfohlene Vorkenntnisse:** Basic to advanced knowledge of hydrogeology, site investigation and modelling
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr.-Ing. habil. Thomas Ptak-Fix
Angebotshäufigkeit: jedes Wintersemester1	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 4	

Georg-August-Universität Göttingen **Modul M.HEG.354: Planning, Working, Writing and Presenting in Science - GIS & Remote Sensing** *English title: Planning, Working, Writing and Presenting in Science - GIS & Remote Sensing*	5 C 4 SWS

Lernziele/Kompetenzen: The aim of this module is to introduce the students to the general workflow, writing and presenting in science. This comprises (1) how to obtain scientific data, (2) how to organize and summarize the relevant information in a report, and finally (3) how to prepare a clear and concise oral presentation of the report. Students can either choose an assigned project (laboratory/field work, geometrical modeling) or a literature research as a basis for their report and oral presentation. The topic of the report and presentation should be related to one of the respective lectures of the prerequisite module. Furthermore the students will have to participate in the weekly seminar of the Applied Geology department. This module focusses on current research topics in the spatial analysis of geological, hydrological and hydrogeological data (vector and raster data) in two and three dimensions and the application of various analysis and correction tools. The skills acquired are expected to be invested into the preparation of the M.Sc. thesis.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltung: Literature Review or Assigned Project (Übung) *Inhalte*: The students will conduct either a literature study or an assigned project on a topic agreed with the supervisor. They will write a report and present their work in the seminar	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	3 C

Lehrveranstaltung: Presentation of Literature Review or Project Work (Seminar) *Inhalte*: This seminar will be organized during one semester. Besides their own presentation, the students are expected to participate also in the presentation of the other candidates.	1 SWS
Prüfung: Präsentation (ca. 20 Minuten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	2 C

Lehrveranstaltung: Applied Geology Seminar (Colloquium) (Seminar) *Course frequency: each semester*	1 SWS

Prüfungsanforderungen: Literature review or assigned project in the area of Remote Sensing and/or GIS. The literature review has to cover publications that deal with GIS- or Remote Sensing related methods in Hydrology, Hydrogeology, Geology or Soil Sciences. If the assigned project or master thesis focuses on GIS, the student should create, import, correct and analyze spatial data to solve a scientific question in the above mentioned fields. A Remote	

Sensing project should comprise data query, preprocessing, correction and processing of multispectral satellite images of various sensors and their geological or hydrological analysis and interpretation.	

Zugangsvoraussetzungen: M.HEG.14	**Empfohlene Vorkenntnisse:** Geology, GIS, Remote Sensing, Statistics, Software skills
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Bianca Wagner
Angebotshäufigkeit: jedes Wintersemester1	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 4	

Georg-August-Universität Göttingen **Modul M.HEG.355: Planning, Working, Writing and Presenting in Science - Groundwater Modeling II** *English title: Planning, Working, Writing and Presenting in Science - Groundwater Modeling II*	5 C 4 SWS

Lernziele/Kompetenzen: The aim of this module is to introduce the students to the general workflow, writing and presenting in science. This comprises (1) how to obtain scientific data, (2) how to organize and summarize the relevant information in a report, and finally (3) how to prepare a clear and concise oral presentation of the report. Students can either choose an assigned project (laboratory/field work, programming/numerical modeling) or a literature research as a basis for their report and oral presentation. The topic of the report and presentation should be related to one of the respective lectures of the prerequisite module. Furthermore the students will have to participate in the weekly seminar of the Applied Geology department. The module focusses on the numerical modeling of saturated and unsaturated flow and transport processes in fractured and porous media. Main topics are vadose zone flow processes, soil-plant interaction, advanced numerical techniques for pore- and fracturescale flow and transport modeling, influence of fracture network geometry on flow and transport, and modeling of reactive transport. The skills acquired are expected to be invested in the preparation of the M.Sc thesis.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltung: Literature Review or Assigned Project (Übung) *Inhalte*: The students will conduct either a literature study or an assigned project on a topic agreed with the supervisor. They will write a report and present their work in the seminar	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	3 C

Lehrveranstaltung: Presentation of Literature Review or Project Work (Seminar) *Inhalte*: This seminar will be organized during one semester. Besides their own presentation, the students are expected to participate also in the presentation of the other candidates.	1 SWS
Prüfung: Präsentation (ca. 20 Minuten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	2 C

Lehrveranstaltung: Applied Geology Seminar (Colloquium) (Seminar) *Course frequency: each semester*	1 SWS

Prüfungsanforderungen: Students are expected to have developed an understanding for flow and transport dynamics in fractured and porous media on various scales and the respective wide range of analytical and numerical techniques. A literature review (report) or assigned	

project (report) should show the competence of the student to identify scale-dependent flow and transport processes and find appropriate ways to assess them. In the case of an assigned project students are expected to independently (1) carry out laboratory experiments in unconsolidated/fractured (saturated or unsaturated) media or (2) to set up a numerical model for small- or large-scale flow and/or transport processes.	

Zugangsvoraussetzungen: keine	**Empfohlene Vorkenntnisse:** M.HEG.310 Basic knowledge of numerical modeling and/or programming
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Jannes Kordilla
Angebotshäufigkeit: jedes Wintersemester1	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 4	

Georg-August-Universität Göttingen **Modul M.HEG.356: Planning, Working, Writing and Presenting in Science - Hydrogeochemistry** *English title: Planning, Working, Writing and Presenting in Science - Hydrogeochemistry*	5 C 4 SWS

Lernziele/Kompetenzen: The aim of this module is to introduce the students to the general workflow, writing and presenting in science. This comprises (1) how to obtain scientific data, (2) how to organize and summarize the relevant information in a report, and finally (3) how to prepare a clear and concise oral presentation of the report. Students can either choose an assigned project (laboratory/field work, programming/numerical modeling) or a literature research as a basis for their report and oral presentation. The topic of the report and presentation should be related to one of the respective lectures of the prerequisite module. Furthermore the students will have to participate in the weekly seminar of the Applied Geology department. This module focusses on current research topics in organic and inorganic hydrogeochemistry, the application of hydrochemical tools or the interpretation of hydrogeochemical data. The skills acquired are expected to be invested into the preparation of the M.Sc. thesis.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltung: Literature Review or Assigned Project (Übung) *Inhalte*: The students will conduct either a literature study or an assigned project on a topic agreed with the supervisor. They will write a report and present their work in the seminar	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	3 C

Lehrveranstaltung: Presentation of Literature Review or Project Work (Seminar) *Inhalte*: This seminar will be organized during one semester. Besides their own presentation, the students are expected to participate also in the presentation of the other candidates.	1 SWS
Prüfung: Präsentation (ca. 20 Minuten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	2 C

Lehrveranstaltung: Applied Geology Seminar (Colloquium) (Seminar) *Course frequency: each semester*	1 SWS

Prüfungsanforderungen: Deeper understanding of chemical processes in the aquatic environment, process based interpretation of hydrochemical data, knowledge on development and application of new tracers and indicators in geosystems, chemical analytical skills, experimental lab work, sampling strategies.	

Zugangsvoraussetzungen:	**Empfohlene Vorkenntnisse:**

M.HEG.13	Hydro(geo)chemistry, Transport processes
Sprache: Englisch	**Modulverantwortliche[r]:** PD Dr. rer. nat. Tobias Licha
Angebotshäufigkeit: jedes Wintersemester1	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 4	

Georg-August-Universität Göttingen **Modul M.HEG.357: Planning, Working, Writing and Presenting in Science - Isotope Geochemistry** *English title: Planning, Working, Writing and Presenting in Science - Isotope Geochemistry*	5 C 4 SWS

Lernziele/Kompetenzen: The aim of this module is to introduce the students to the general workflow, writing and presenting in science. This comprises (1) how to obtain scientific data, (2) how to organize and summarize the relevant information in a report, and finally (3) how to prepare a clear and concise oral presentation of the report. Students can either choose an assigned project (laboratory/field work, programming/numerical modeling) or a literature research as a basis for their report and oral presentation. The topic of the report and presentation should be related to one of the respective lectures of the prerequisite module. Furthermore the students will have to participate in the weekly seminar of the Applied Geology department. This module focusses on the application of modern isotope techniques to hydro(geo)logical and environmental research questions. Students will learn about isotope geochemistry and apply isotope methods to better understand complex hydro-geochemical processes (e.g. solute generation, water-rock interaction, surface water/ groundwater interaction) in catchments and groundwater systems. The students will have to write a literature review report and prepare an oral presentation on a specific topic related to the use of isotopes in hydrogeology or environmental science. The skills acquired are expected to be invested into the preparation of the M.Sc. thesis.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltung: Literature Review or Assigned Project (Übung) *Inhalte*: The students will conduct either a literature study or an assigned project on a topic agreed with the supervisor. They will write a report and present their work in the seminar	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	3 C

Lehrveranstaltung: Presentation of Literature Review or Project Work (Seminar) *Inhalte*: This seminar will be organized during one semester. Besides their own presentation, the students are expected to participate also in the presentation of the other candidates.	1 SWS
Prüfung: Präsentation (ca. 20 Minuten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	2 C

Lehrveranstaltung: Applied Geology Seminar (Colloquium) (Seminar) *Course frequency: each semester*	1 SWS

Prüfungsanforderungen:	

The student needs to demonstrate that she/ he has a profound understanding of isotope geochemistry and is able to conduct her/his own research by integrating isotope methods to interpret and model hydro(geo)chemical processes in an actual research project (M.Sc. thesis).	

Zugangsvoraussetzungen: M.HEG.11, M.HEG.13	**Empfohlene Vorkenntnisse:** keine
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Bettina Wiegand
Angebotshäufigkeit: jedes Wintersemester1	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 4	

Georg-August-Universität Göttingen **Modul M.HEG.358: Planning, Working, Writing and Presenting in Science - Georeservoirs** *English title: Planning, Working, Writing and Presenting in Science - Georeservoirs*	5 C 4 SWS

Lernziele/Kompetenzen: The aim of this module is to introduce the students to the general workflow, writing and presenting in science. This comprises (1) how to obtain scientific data, (2) how to organize and summarize the relevant information in a report, and finally (3) how to prepare a clear and concise oral presentation of the report. Students can either choose an assigned project (laboratory/field work, programming/numerical modeling) or a literature research as a basis for their report and oral presentation. The topic of the report and presentation should be related to one of the respective lectures of the prerequisite module. Furthermore the students will have to participate in the weekly seminar of the Applied Geology department. This module focusses on Georeservoirs (processes, environments, characterization, applications). The skills acquired are expected to be invested into the preparation of the M.Sc. thesis.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 94 Stunden

Lehrveranstaltung: Literature Review or Assigned Project (Übung) *Inhalte*: The students will conduct either a literature study or an assigned project on a topic agreed with the supervisor. They will write a report and present their work in the seminar	2 SWS
Prüfung: Hausarbeit (max. 10 Seiten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	3 C

Lehrveranstaltung: Presentation of Literature Review or Project Work (Seminar) *Inhalte*: This seminar will be organized during one semester. Besides their own presentation, the students are expected to participate also in the presentation of the other candidates.	1 SWS
Prüfung: Präsentation (ca. 20 Minuten) **Prüfungsvorleistungen:** 12 participations in the weekly seminar of the Applied Geology department, certified.	2 C

Lehrveranstaltung: Applied Geology Seminar (Colloquium) (Seminar) *Course frequency: each semester*	1 SWS

Prüfungsanforderungen: Students are expected to have developed an understanding of flow and transport processes in georeservoirs, the respective characterization and modeling methods. Literature review (report) or assigned project (report) in the area of Geothermics and Georeservoirs.	

Zugangsvoraussetzungen: M.HEG.24	**Empfohlene Vorkenntnisse:**

	Insight into coupled THMC processes in georeservoirs, and knowledge of hydraulic and tracer methods are of advantage (though not being mandatory)
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. rer. nat. Iulia Ghergut
Angebotshäufigkeit: jedes Wintersemester1	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** 3
Maximale Studierendenzahl: 4	