

# Vorlesungsverzeichnis

Master of Science - Remote Sensing, geInformation  
and Visualization

Prüfungsversion Wintersemester 2017/18

Wintersemester 2024/25

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# Abkürzungsverzeichnis

## Veranstaltungsarten






AG	Arbeitsgruppe
B	Blockveranstaltung
BL	Blockseminar
DF	diverse Formen
EX	Exkursion
FP	Forschungspraktikum
FS	Forschungsseminar
FU	Fortgeschrittenenübung
GK	Grundkurs
HS	Hauptseminar
KL	Kolloquium
KU	Kurs
LK	Lektürekurs
LP	Lehrforschungsprojekt
OS	Oberseminar
P	Projektseminar
PJ	Projekt
PR	Praktikum
PS	Proseminar
PU	Praktische Übung
RE	Repetitorium
RV	Ringvorlesung
S	Seminar
S1	Seminar/Praktikum
S2	Seminar/Projekt
S3	Schulpraktische Studien
S4	Schulpraktische Übungen
SK	Seminar/Kolloquium
SU	Seminar/Übung
TU	Tutorium
U	Übung
UN	Unterricht
UP	Praktikum/Übung
UT	Übung / Tutorium
V	Vorlesung
V5	Vorlesung/Projekt
VE	Vorlesung/Exkursion
VK	Vorlesung/Kolloquium
VP	Vorlesung/Praktikum
VS	Vorlesung/Seminar
VU	Vorlesung/Übung
W	Werkstatt
WS	Workshop

## Veranstaltungsrhythmen

wöch.	wöchentlich
14t.	14-täglich
Einzel	Einzeltermin

Block	Block
BlockSa	Block (inkl. Sa)
BlockSaSo	Block (inkl. Sa,So)

## Andere

N.N.	Noch keine Angaben
n.V.	Nach Vereinbarung
LP	Leistungspunkte
SWS	Semesterwochenstunden
	Belegung über PULS
	Prüfungsleistung
	Prüfungsnebenleistung
	Studienleistung
	sonstige Leistungserfassung

# Vorlesungsverzeichnis

## Pflichtmodule

### GEW-RCM01 - Remote Sensing of the Environment

#### 108517 VU - Remote Sensing of the Environment

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mo	10:15 - 11:45	wöch.	2.27.1.10	14.10.2024	Prof. Dr. Bodo Bookhagen, Sofia Alejandra Viotto
1	U	Mo	12:15 - 13:45	wöch.	2.27.1.10	14.10.2024	Prof. Dr. Bodo Bookhagen, Sofia Alejandra Viotto

#### Leistungen in Bezug auf das Modul

PNL 574412 - Übung zu ausgewählten Themen (unbenotet)

### GEW-RCM02 - Earth System Science

#### 108556 V - Earth System Science

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Di	12:30 - 14:00	wöch.	2.27.1.10	15.10.2024	Prof. Dr. Bodo Bookhagen
1	V	Di	14:15 - 15:45	14t.	2.27.1.10	15.10.2024	Prof. Dr. Bodo Bookhagen
1	S	Di	14:15 - 15:45	14t.	2.27.1.10	22.10.2024	Prof. Dr. Bodo Bookhagen

#### Leistungen in Bezug auf das Modul

PNL 574512 - Seminare zu ausgewählten Themen (unbenotet)

### GEW-RCM03 - Data Analysis and Statistics

#### 108557 VU - Data Analysis and Statistics (MS RGV)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	09:00 - 17:00	Block	2.27.1.10	07.10.2024	Dr. rer. nat. Aljoscha Rheinwald
1	U	Di	16:15 - 17:45	14t.	2.27.0.29/30	15.10.2024	Dr. rer. nat. Aljoscha Rheinwald

#### Bemerkung

The seminar en block will be for three full days in room 1.10 of house 27 on the 7th, 8th and 9th of October.

#### Leistungen in Bezug auf das Modul

PNL 574612 - Vorlesung und Übung (unbenotet)

### GEW-RCM04 - Geoinformation Systems

#### 108558 VU - Geoinformation Systems

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mi	08:30 - 10:00	wöch.	2.27.0.29/30	23.10.2024	Dr. rer. nat. Wolfgang Schwanghart

1	VU	Mi	10:15 - 11:45	wöch.	2.27.0.29/30	23.10.2024	Dr. rer. nat. Wolfgang Schwanghart
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**Leistungen in Bezug auf das Modul**

PNL 574711 - Geoinformation Systems - Vorlesung und Übung (unbenotet)

**GEW-RCM05 - Visualization and Communication**

**108498 SK - Kolloquium / Topics in Earth System Science**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	SK	Mo	16:15 - 17:45	wöch.	2.27.0.01	14.10.2024	Prof. Dr. Martin Trauth, Prof. Dr. Jens Tronicke, Professor Edward Sobel, Prof. Dr. Maria Mutti, Prof. Dr. Frank Krüger, Prof. Dr. Max Wilke, Prof. Dr. Patrick O'Brien, Prof. Dr. Bodo Bookhagen, Prof. Dr. Pieter van der Beek

**Leistungen in Bezug auf das Modul**

SL 574812 - Seminar (unbenotet)

**108551 VU - Visualization and Communication (MS RGV)**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Do	12:30 - 14:00	wöch.	2.27.0.29/30	17.10.2024	Prof. Dr. Manfred Strecker
1	U	Do	14:15 - 15:45	wöch.	2.27.0.29/30	17.10.2024	Prof. Dr. Manfred Strecker

**Kommentar**

The module syllabus is based on the instructor's textbook and includes literature and data research, identifying scientific and controversial material, drafting a data analysis project, using modern visualization techniques, and presentation techniques for an expert or lay audience as well as decision-makers.

**Literatur**

Trauth, M.H., Sillmann, E. (2018) Collecting, Processing and Presenting Geoscientific Information, MATLAB® and Design Recipes for Earth Sciences – Second Edition. Springer Verlag, 274 p., Supplementary Electronic Material, Hardcover, ISBN: 978-3-662-56202-4.

**Bemerkung**

The course consists of three parts:

(1) Lectures and demos on Thursdays 12:30-15:45 in person in room 2.27.1.10 and live on Zoom

<https://uni-potsdam.zoom.us/j/68613508954>

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(2) Q/A and student's weekly challenges

(3) Seminar with invited lectures.

**Leistungen in Bezug auf das Modul**

SL 574811 - Vorlesung und Übung (unbenotet)

## Wahlpflichtmodule

### Wahlbereich: Remote sensing Methods



### GEW-RSM01 - Optical Remote Sensing

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

### GEW-RSM02 - Terrestrial and Airborne Lidar and Photogrammetry Systems

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

### GEW-RSM04 - Earth Surface Deformation and Radar Satellite Interferometry (InSAR)

#### 110885 VU - Earth Surface Deformation and Radar Satellite Interferometry (InSAR)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	09:00 - 17:00	Block	2.27.0.29/30	07.10.2024	Dr. Sabrina Metzger

#### Kommentar

You will learn the basic theory of, and how to get access to, process, interpret and model radar interferometric (InSAR) data to study crustal deformation phenomena like earthquakes, volcanic inflation, and interseismic strain accumulation. We will work with the open source software [SNAP](#), kite and talpa from the pyrocko-software-suite. A basic knowledge of MATLAB and shell scripting is advantageous, but not mandatory.

The main part will be taught in a 1-week-block course before the semester, plus some additional seminars during the semester, in which you will also pursue a personal project study.

#### Leistungen in Bezug auf das Modul

PNL 575111 - Blockkurs oder Vorlesung mit Übung (unbenotet)

#### 110886 VS - Earth Surface Deformation and Radar Satellite Interferometry (InSAR)

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VS	Di	16:15 - 17:45	14t.	2.27.0.29/30	22.10.2024	Dr. Sabrina Metzger

#### Kommentar

You will learn how to get access to, process, interpret and model radar interferometric data to study crustal deformation phenomena like earthquakes, volcanic inflation, and interseismic strain accumulation. We will work with the open source software [SNAP](#), kite and talpa from the pyrocko-software-suite. A basic knowledge of MATLAB and shell scripting is advantageous, but not mandatory.

#### Leistungen in Bezug auf das Modul

PNL 575112 - Seminar (unbenotet)

### GEW-RSM05 - Advanced Topics of Remote Sensing

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

## Wahlbereich: Objects of Observation

### BIO-OBS03 - Biosphere of the Earth

#### 110221 S - Aktuelle Themen im wissenschaftlichen Naturschutz / Current questions and methods in conservation biology

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	SU	Do	12:15 - 13:45	wöch.	5.02.1.01	17.10.2024	PD Dr. Niels Blaum

Literaturseminar wöchentlich

2	BL	N.N.	N.N.	Einzel	N.N.	N.N.	PD Dr. Niels Blaum
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Planspiel Wolfsmanagement Brandenburg; 2 Einzeltermine jeweils von 10.00-15.00 Uhr (Termine finden Ende November Anfang Dezember statt), Vorbesprechung am ersten Termin von Gruppe 1.

Kommentar	
MÖEN: Teil des Richtungsmoduls Naturschutz	
MS-EEC: obligatory part of the module Scientific Nature Conservation with exercise part in summer semester	
Gruppe 1 Weekly Seminar	
Gruppe 2 2 Tage Blockkurs Planspiel Wolfsmanagement Brandenburg; 2 Einzeltermine jeweils von 10.00-15.00 Uhr (Termine finden Ende November Anfang Dezember statt), Vorbesprechung am ersten Termin von Gruppe 1.	
Leistungen in Bezug auf das Modul	
SL	549092 - Seminar oder Übung zur Biosphäre der Erde (unbenotet)

110253 V - Wissenschaftliche Grundlagen des Naturschutzes							
Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	12:15 - 13:45	wöch.	5.03.1.04	16.10.2024	Dr. Kolja Bergholz
Kommentar							
Note: This lecture is also an optional part of the EEC module <a href="#">Scientific nature conservation</a> , see module book. The lecture is in German but English slides will be provided via moodle.							
Leistungen in Bezug auf das Modul							
SL	549091 - Vorlesung zur Biosphäre der Erde (unbenotet)						

### GEE-OBS01 - Soilscape Processes

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

### GEW-OBS02 - Erosion and Earth surface dynamics

108515 VU - Earth Surface Processes							
Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Di	12:30 - 14:00	wöch.	2.27.2.07	15.10.2024	Prof. Dr. Pieter van der Beek, Prof. Dr. Taylor Schildgen
1	VU	Di	14:15 - 15:45	wöch.	2.27.2.07	15.10.2024	Prof. Dr. Pieter van der Beek, Prof. Dr. Taylor Schildgen



**Kommentar**

**Contents**

This course deals with the dynamics of Earth-surface processes: erosion, transport and deposition on slopes, by rivers and glaciers. Physical and mathematical models describing these processes are presented and analyzed using available field observations. In addition, the course examines the couplings between tectonics and climate-driven surface processes in landscape evolution. Topics are explored in depth through the reading of scientific papers, followed by group discussion and presentation of research topics to groups of students.

**Qualification goals**

Students:

acquire an understanding of the processes that drive erosion and sediment transport at the Earth's surface, as well as tectonically controlled landscape genesis at plate boundaries and tectonically active regions within continents.

become familiar with modern quantitative methods for observing and modeling Earth-surface processes and their controlling factors.

Learn to analyze and synthesize modern research questions in surface processes and their couplings through literature review, presentations, and group discussions.

**Literatur**

**Textbooks :**

R.S. Anderson & S.P. Anderson, Geomorphology: The Mechanics and Chemistry of Landscapes. .

D. Burbank & R.S. Anderson, Tectonic Geomorphology (2nd Ed.), .

P.R. Bierman & D.R. Montgomery, Key Concepts in Geomorphology (2nd Ed.), .

Additional background papers available on Moodle.

**Leistungen in Bezug auf das Modul**

PNL 573611 - Erosion and Earth surface dynamics - Vorlesung und Seminar (unbenotet)

**GEW-OBS04 - Remote Sensing of Permafrost Regions**

108542 VS - Remote Sensing of Permafrost Regions							
Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Di	08:30 - 10:00	wöch.	2.27.0.29/30	15.10.2024	Dr. Ingmar Nitze, Prof. Dr. Guido Große, Sara Tabea Rettelbach
1	SU	Di	10:15 - 11:45	wöch.	2.27.0.29/30	15.10.2024	Prof. Dr. Guido Große, Dr. Ingmar Nitze, Sara Tabea Rettelbach

**Kommentar**

In this module, we will focus on remote sensing of terrestrial regions of the Arctic that are not glaciated but affected by permafrost - about one quarter of the northern hemisphere landmass is part of the permafrost zone and thus a huge diversity of landforms, land cover, processes, and dynamics are encountered that are partially or fully driven by freezing and thawing processes on various spatial and temporal scales. These regions are vast, far away, logistically challenging, and data-sparse. Remote sensing therefore often provides the tools of choice for many analyses needed to better understand how permafrost regions change in a rapidly warming Arctic and what the local to global feedbacks are.

Learn about Arctic Climate Change, Cryosphere, and Permafrost; Permafrost landscapes, disturbances, trends; Northern land cover and vegetation; Permafrost terrain and landforms; Thaw subsidence and frost heave; Permafrost coastal dynamics; and Thermokarst lake dynamics. Learn to use cool data and techniques for characterizing and quantifying landscape dynamics in a rapidly changing Arctic: We will cover high resolution airborne data, high and medium resolution satellite imagery, LiDAR, Big Data approaches with Google Earth Engine, and an overview into several other methods. You also will work on a specific semester project in a 2-student team and work on milestones throughout the semester. You will select the project topic at the beginning of the module and present the project outcome at the semester end. The remote sensing methods from this module will be easily applicable to other regions on Earth.

**Voraussetzung**

Seminars/Exercises will have a strong focus on Google Earth Engine and GIS Desktop systems. You will need to establish a free Google Earth Engine User Account. You will need to install an ArcGIS (student) license on your computer. For one of the seminars on remote sensing of permafrost coastal erosion you will need to install the Digital Shoreline Analysis System (DSAS) for ArcGIS tool.

**Literatur**

The module will rely on latest research papers on remote sensing of permafrost regions. Detailed literature lists will be provided through Moodle. Here are some general literature examples on the topic:

Permafrost: French, H. M. (2007) The Periglacial Environment, 3rd Edition, Wiley, ISBN: 978-0-470-86588-0, 478 pp.

Remote Sensing of Permafrost Regions: Jorgenson MT, Grosse G (2016): Remote Sensing of Landscape Change in Permafrost Regions. Permafrost and Periglacial Processes, 27(4): 324-338. doi: 10.1002/ppp.1914.

Remote Sensing of Permafrost Regions: Westermann S, Duguay C, Grosse G, Kääh A (2015): Remote sensing of permafrost and frozen ground. In: Tedesco M (ed.): Remote sensing of the Cryosphere, pp. 307-344. Hoboken, NJ, Wiley Blackwell, 408 p., doi: 10.1002/9781118368909.ch13.

**Lerninhalte**

Introduction to Climate Change, Arctic Cryosphere, and Permafrost; Introduction to Remote Sensing of Permafrost Regions; Permafrost Landscapes and Dynamics; Permafrost Terrain and Landform Characterization; Permafrost Region Land Cover and Vegetation; Time Series Analysis and Change Detection; Big Data and Machine Learning in Remote Sensing; Big Data and Deep Learning in Remote Sensing; Remote Sensing of High Latitude Lakes and Lake Change; Arctic aquatic remote sensing; Close-range remote sensing; Observing Permafrost Coastal Dynamics; Advanced remote sensing methods for permafrost; Repetitorium / Quiz; Presentation of remote sensing semester project results; Written Exam

**Zielgruppe**

The module targets remote sensing enthusiasts with an interest in Polar Regions. Ideally, you are already aware of the importance of climate change in the Arctic and understand the importance of global-scale feedbacks in the Earth System, you like to play with different remote sensing approaches, and you enjoy working with images as well as bits and bytes. Overall, the remote sensing methods used in the module are also applicable also in other regions.

**Leistungen in Bezug auf das Modul**

PNL 573712 - Seminar zum Projektverlauf (unbenotet)

**GEW-OBS05 - Earthquake and Volcano deformation**

**108553 VU - Earthquake and Volcano Deformation**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mi	14:15 - 15:45	wöch.	2.27.2.37/38	16.10.2024	Prof. Dr. Thomas Walter
1	VU	Mi	16:15 - 17:45	wöch.	2.27.2.37/38	16.10.2024	Prof. Dr. Thomas Walter

**Kommentar**

**Volcanoes and earthquakes deform on different scales.** Magma chambers inflate and cause a volcano to rise. Faults are displaced and cause surface deformation. Slow changes such as cooling, compaction, or creep lead to major landforms on geologic time scales.

**The goal of this module is to better understand deformation processes and learn basic techniques and data analysis methods for quantifying them.** This module provides an introduction to volcanic and tectonic deformation processes, with a special emphasis on cross-disciplines that include geological field observations, geodetic monitoring technologies, and geophysical interpretation tools.

Geologic and geophysical field techniques as well as active and passive remote sensing methods are explained and applied to study deformation processes related to gravity tectonics, spreading, body forces, magma tectonics, dyke emplacement and cooling, and faulting associated with earthquakes and slip events. In addition, the course examines the couplings between volcanoes and tectonic processes.

The student will learn many different techniques and analysis approaches, from manual pixel and feature tracking, to image cross correlation and particle image velocimetry, to topography change and DEM of difference analysis, to radar interferometry (InSAR), and finally gain insight into basic modeling techniques.

During the course, theory and examples will be explained by the instructor, followed by group work in class and a small weekly homework assignment to practice the analysis.

**The main objectives of the course are (1) to gain a better understanding of the processes and sources associated with volcanoes and earthquakes, (2) to gain an overview of commonly used and innovative methods for quantifying and analyzing deformation, and (3) to train creative thinking and selection strategies for data and methods.**

Detailed materials for the online course, data and tools, weekly homeworks and results are available on the Moodle site ( [deform23\\_24](#) ).

**Literatur**

Segall, P. 2010, Earthquake and Volcano Deformation, Princeton University Press, 456 pp.; Dzurisin, D. 2006, Volcano Deformation, Springer Verlag, 256pp.; additional materials will be posted on the course website

**Lerninhalte**

More details and exchange of materials will be provided on the moodle pages related to the course (short name on moodle: [deform23\\_24](#) )

**Zielgruppe**

Students in all fields of Geosciences, from Geophysics, Remote Sensing, Geology and others are warmly welcome!

**Leistungen in Bezug auf das Modul**

PNL 573811 - Vorlesung und Seminar (unbenotet)

**GEW-OBS06 - Earth Magnetic Field and Physics of the Upper Atmosphere**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEW-OBS08 - Planetary Remote Sensing**

 **108552 V - Planetary Remote Sensing**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	12:15 - 13:45	wöch.	2.27.1.10	16.10.2024	Prof. Dr. Gabriele Arnold
1	EX	N.N.	N.N.	Einzel	N.N.	N.N.	Prof. Dr. Gabriele Arnold

**Kommentar**

The lecture is intended for Master students of Earth Sciences and the course Remote Sensing, Geoinformation and Visualization.

The lecture covers the basics of remote sensing with a focus on the specifics of planetary remote sensing. The course will also focus on the inner solar system and its exploration using the developed methods.


The course includes a field trip to the Institute of Planetary Research of the German Aerospace Center (DLR) in Berlin-Adlershof.

<b>Literatur</b>
Literature will be announced during the lecture.
<b>Lerninhalte</b>
Fundamentals of planetary remote sensing and inner solar system.
<b>Leistungen in Bezug auf das Modul</b>
PNL 574011 - Planetary Remote Sensing - Vorlesung und Übung (unbenotet)

**GEW-OBS09 - Planetary Physics**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEE-M-V02 - Atmospheric Science in the Anthropocene**

 <b>109662 VS - Atmospheric Science in the Anthropocene</b>							
Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Do	14:15 - 15:45	wöch.	2.05.1.08	17.10.2024	Prof. Dr. Mark Lawrence
1	S	Do	16:00 - 17:30	wöch.	2.05.1.08	17.10.2024	Prof. Dr. Mark Lawrence

**Kommentar**

This lecture and exercise are part of the module "GEE-M-V02: Atmospheric Science in the Anthropocene". [Module description \(in German\)](#) | [Module description \(in English\)](#)

The course provides an overview of the main topics of atmospheric sciences in the context of global change will include: Basic principles of meteorology (meteorological elements, primitive equation theorem, horizontal and vertical structure of the atmosphere); atmospheric dynamics; weather systems; atmospheric composition and atmospheric chemistry; chemistry-climate interactions; and broader topics such as extreme air pollution, climate engineering, and the link between atmospheric science and society. Seminar presentations will refer to the IPCC WG-1 report. Recommended textbook: "Atmospheric Science, an Introductory Survey", by Wallace and Hobbs. (The book will be used mainly for the first half of the lecture, after which more specialised literature will be used).


**Leistungen in Bezug auf das Modul**

PNL 564711 - Vorlesung und Seminar (unbenotet)

**GEW-OBS11 - Advanced Topics of Objects of Observations**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEW-MGEW26 - Coastal dynamics**

 <b>108547 VS - Coastal Dynamics</b>							
Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Mi	14:15 - 15:45	wöch.	2.27.1.10	16.10.2024	Prof. Dr. Hugues Lantuit
1	S	Mi	16:15 - 17:45	wöch.	2.27.1.10	16.10.2024	Prof. Dr. Hugues Lantuit

## Kommentar

This course is meant to provide future practitioners with a holistic understanding of coastal change and its implications. It is geared towards students in several fields taught at the university, including geoscience, remote sensing and geoeology

### 1) Skills:

The students will learn basic concepts of coastal geomorphology and coastal processes. They will learn about the relevance of these processes in the real world and the methods used to study and/or address them

### 2) Methods:

The students will learn how to quantitatively analyze wave dynamics, sediment transport and coastline dynamics

3) The students will be able to use the skills taught in the course to devise holistic studies of coastal dynamics, understanding coastal processes and their implications for coastal management

The lecture will cover the following topics:

- Coastal classifications
- Shoreline definitions
- Tectonics and coasts
- Coastal landforms
- Sea level change / Bruun rule
- Wave theory
- Littoral sediment budgets and cells
- Wave energy and energy flux
- Wave refraction and wave breaking
- Wave set-up, set-down and run-up
- Shoreface profiles
- Cross-shore sediment transport
- Nearshore currents
- Longshore currents
- Coastal engineering and coastal protection
- Coastal ecology – aquatic ecosystems
- Coastal ecology – subaerial ecosystems
- Coastal biogeochemistry – natural carbon and nutrient influx
- Coastal biogeochemistry – anthropogenic fluxes and eutrophication
- Coasts and climate change - adaptation and mitigation strategies
- Legal statuses of coastal systems
- Coastal conservation
- Integrated Coastal Zone Management (ICZM)
- Legal statuses of coastal systems
- Coastal conservation

### 1) Fachkompetenzen:

Die Studierenden kennen die Grundlagetheorie der Küstenmorphologie sowie der Küstenprozesse, kennen wichtige Anwendungsfälle und können die einschlägigen Methoden verstehen.

### 2) Methodenkompetenzen

Die Studierenden können Sedimenttransport und Küstenliniendynamik quantitativ analysieren.

### 3) Handlungskompetenzen

Mit den erworbenen Fach- und Methodenkompetenzen können die Studenten eigenverantwortlich eine integrierte Studie zur Küstenbewegung planen, die relevante Aufgabenstellung setzen und diese selbständig bearbeiten.

Die Vorlesung wird sich mit folgenden Aspekten der Küstendynamik befassen:

- Coastal classifications
- Shoreline definitions
- Tectonics and coasts
- Coastal landforms
- Sea level change / Bruun rule
- Wave theory
- Littoral sediment budgets and cells
- Wave energy and energy flux
- Wave refraction and wave breaking
- Wave set-up, set-down and run-up
- Shoreface profiles
- Cross-shore sediment transport
- Nearshore currents
- Longshore currents
- Coastal engineering and coastal protection
- Coastal ecology – aquatic ecosystems
- Coastal ecology – subaerial ecosystems
- Coastal biogeochemistry – natural carbon and nutrient influx
- Coastal biogeochemistry – anthropogenic fluxes and eutrophication
- Coasts and climate change - adaptation and mitigation strategies
- Legal statuses of coastal systems
- Coastal conservation
- Integrated Coastal Zone Management (ICZM)
- Legal statuses of coastal systems
- Coastal conservation

**Leistungen in Bezug auf das Modul**

PNL 572511 - Vorlesung und Seminar (unbenotet)

## Wahlbereich: Data Analysis and Programming

**MAT-DAP01 - Bayesian Inference and Data Assimilation**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEW-DAP02 - Nonlinear Data Analysis Concepts**

**108543 VS - Nonlinear Data Analysis Concepts**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VS	Do	08:30 - 10:00	wöch.	2.27.0.29/30	17.10.2024	PD Dr. Norbert Marwan
1	VS	Do	10:15 - 11:45	wöch.	2.27.0.29/30	17.10.2024	PD Dr. Norbert Marwan

**Voraussetzung**

- Basic understanding of mathematical concepts and statistics
- Capable to independently and creatively utilize numerical software like Python, Julia, or MATLAB
- Successful participation of the course "Data Analysis and Statistics" or similar course

**Leistungsnachweis**

The examination takes the form of a small project work. The project report is expected to be written in the form of a scientific article. To be eligible for the examination, 60% of the practice exercises during the semester must be successfully completed.

**Lerninhalte**

The lecture introduces the basic concepts of nonlinear dynamics and chaos and how they can be applied for the study of complex systems, spatiotemporal data, and nonlinear interrelationships in geosciences. The specific topics contain

- Basic terminology, dynamical systems, and simple prototypical models
- Dimensions, fractals
- Concept of symbolic dynamics
- Concept of phase space, phase space reconstruction, Lyapunov exponent and correlation sum
- Concept of recurrence in phase space, recurrence plots, recurrence quantification analysis
- Detection of regime transitions, statistical tests
- Concept of synchronization, coupling analysis
- Spatial and spatio-temporal data analysis using recurrence features
- Complex networks, network models, measures, network representations
- Functional networks, reconstruction of networks, climate networks
- Complex networks based time series analysis

**Leistungen in Bezug auf das Modul**

PNL 572711 - Vorlesung und Seminar (unbenotet)

**GEW-DAP03 - Big Data Analytics**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEW-DAP04 - Spatial data analysis with numerical methods**

**108559 VU - Spatial data analysis with numerical methods**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	N.N.	09:00 - 17:00	Block	2.27.0.29/30	17.02.2025	Dr. rer. nat. Aljoscha Rheinwald

**Kommentar**

This seminar en block will take place on six full days in February in the computer lab of house 27 (ground floor). The dates are the 17th, 18th, 20th, 21st, 24th and 25th of February.

**Leistungen in Bezug auf das Modul**

PNL 572911 - Vorlesung und Übung (unbenotet)

**GEW-DAP05 - Advanced Topics of Data Analysis and Programming**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEW-DAP06 - Earth Surface Process Modelling**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

## Wahlbereich: Geoinformation System and Applications

**GEE-GIS03 - Environmental Spatial Statistics and Models**

**108570 VU - Environmental Spatial Statistics and Models**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	VU	Mo	14:15 - 15:45	wöch.	2.27.2.37/38	21.10.2024	Dr. rer. nat. Wolfgang Schwanghart
1	VU	Mo	16:15 - 17:45	wöch.	2.27.2.37/38	21.10.2024	Dr. rer. nat. Wolfgang Schwanghart

**Leistungen in Bezug auf das Modul**

PNL 573314 - Spatial statistics (unbenotet)

**GEW-GIS01 - Analysis of Digital Elevation Models**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEW-GIS01 - Analysis of Digital Elevation Models (auslaufend)**

Dieses Modul gilt, aufgrund einer Änderungssatzung, nur noch für Studierende, die das Modul vor dem 01.10.2023 begonnen haben. Das Modul läuft spätestens am 30.09.2025 aus.

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEW-GIS02 - Mapping and Geoinformation Systems**

**108518 VU - Mapping and Geoinformation Systems**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	V	Fr	10:15 - 11:00	wöch.	2.25.D0.01	18.10.2024	Dr. Gerold Zeilinger
1	U	Fr	11:00 - 11:45	wöch.	2.25.D0.01	18.10.2024	Dr. Gerold Zeilinger
1	SU	Fr	12:15 - 13:45	wöch.	2.25.D0.01	18.10.2024	Dr. Gerold Zeilinger

**Kommentar**

Main topics are: design of GIS-database, GIS content management, data distribution with GIS-servers, integration of modeling results in GIS, analyses of river networks and geomorphic parameters, analysis of structural data, remote sensed imagery interpretation and digital elevation model extraction, integration of LIDAR data and utilization of geological 3D models in immersive visualization environments.

**Leistungen in Bezug auf das Modul**

PNL 573212 - Mapping and Geoinformation Systems - Vorlesung und Übung (unbenotet)

**GEW-GIS05 - Advanced Topics of Geographic Information Systems**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

## Wahlbereich: Visualization and Communication Methods

**GEW-VCM01 - Examples of Visualization and Communication Methods**



Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

**GEW-VCM02 - Industry Internship or Practical Application**

 **108561 PR - Industry Internship or Practical Application**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	PR	N.N.	N.N.	Einzel	N.N.	N.N.	Prof. Dr. Bodo Bookhagen

**Leistungen in Bezug auf das Modul**

SL	575411 - Praktikum (mind. 3 Wochen) (unbenotet)
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**GEW-VCM03 - Extended Industry Internship or Practical Application**

 **108560 PR - Extended Industry Internship or Practical Application**

Gruppe	Art	Tag	Zeit	Rhythmus	Veranstaltungsort	1.Termin	Lehrkraft
1	PR	N.N.	N.N.	Einzel	N.N.	N.N.	Prof. Dr. Bodo Bookhagen

**Leistungen in Bezug auf das Modul**

SL	575511 - Praktikum (mind. 3 Wochen) (unbenotet)
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**GEW-VCM04 - Advanced Topics of Visualization and Communication Methods**

Für dieses Modul werden aktuell keine Lehrveranstaltungen angeboten

# Glossar

Die folgenden Begriffserklärungen zu Prüfungsleistung, Prüfungsnebenleistung und Studienleistung gelten im Bezug auf Lehrveranstaltungen für alle Ordnungen, die seit dem WiSe 2013/14 in Kraft getreten sind.

- Prüfungsleistung** Prüfungsleistungen sind benotete Leistungen innerhalb eines Moduls. Aus der Benotung der Prüfungsleistung(en) bildet sich die Modulnote, die in die Gesamtnote des Studiengangs eingeht. Handelt es sich um eine unbenotete Prüfungsleistung, so muss dieses ausdrücklich („unbenotet“) in der Modulbeschreibung der fachspezifischen Ordnung geregelt sein. Weitere Informationen, auch zu den Anmeldeöglichkeiten von Prüfungsleistungen, finden Sie unter anderem in der [Kommentierung der BaMa-O](#)
- Prüfungsnebenleistung** Prüfungsnebenleistungen sind für den Abschluss eines Moduls relevante Leistungen, die – soweit sie vorgesehen sind – in der Modulbeschreibung der fachspezifischen Ordnung beschrieben sind. Prüfungsnebenleistungen sind immer unbenotet und werden lediglich mit "bestanden" bzw. "nicht bestanden" bewertet. Die Modulbeschreibung regelt, ob die Prüfungsnebenleistung eine Teilnahmevoraussetzung für eine Modulprüfung oder eine Abschlussvoraussetzung für ein ganzes Modul ist. Als Teilnahmevoraussetzung für eine Modulprüfung muss die Prüfungsnebenleistung erfolgreich vor der Anmeldung bzw. Teilnahme an der Modulprüfung erbracht worden sein. Auch für Erbringung einer Prüfungsnebenleistung wird eine Anmeldung vorausgesetzt. Diese fällt immer mit der Belegung der Lehrveranstaltung zusammen, da Prüfungsnebenleistung im Rahmen einer Lehrveranstaltungen absolviert werden. Sieht also Ihre fachspezifische Ordnung Prüfungsnebenleistungen bei Lehrveranstaltungen vor, sind diese Lehrveranstaltungen zwingend zu belegen, um die Prüfungsnebenleistung absolvieren zu können.
- Studienleistung** Als Studienleistung werden Leistungen bezeichnet, die weder Prüfungsleistungen noch Prüfungsnebenleistungen sind.



# Impressum

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## Umsatzsteueridentifikationsnummer

DE138408327

## Layout und Gestaltung

[jung-design.net](http://jung-design.net)

## Druck

14.9.2024

## Rechtsform und gesetzliche Vertretung

Die Universität Potsdam ist eine Körperschaft des Öffentlichen Rechts. Sie wird gesetzlich vertreten durch Prof. Oliver Günther, Ph.D., Präsident der Universität Potsdam, Am Neuen Palais 10, 14469 Potsdam.

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## Inhaltliche Verantwortlichkeit i. S. v. § 5 TMG und § 55 Abs. 2 RStV

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