

Module Catalogue

for the Module studies (Bachelor)

Geography

Examination regulations version: 2020

Responsible: Faculty of Arts, Historical, Philological, Cultural and Geographical

Studies

Responsible: Institute of Geography and Geology



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The subject is divided into

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Abbreviations used

Course types: $\mathbf{E} = \text{field trip}$, $\mathbf{K} = \text{colloquium}$, $\mathbf{O} = \text{conversatorium}$, $\mathbf{P} = \text{placement/lab course}$, $\mathbf{R} = \text{project}$, $\mathbf{S} = \text{seminar}$, $\mathbf{T} = \text{tutorial}$, $\ddot{\mathbf{U}} = \text{exercise}$, $\mathbf{V} = \text{lecture}$

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B/NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: A = thesis, LV = course(s), PL = assessment(s), TN = participants, VL = prerequisite(s)

Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

15-May-2019 (2019-36)

27-Jun-2019 (2019-41)

14-Nov-2019 (2019-52)

22-Jan-2020 (2020-13)

o6-May-2020 (2020-39)

22-Jul-2020 (2020-57)

17-Dec-2020 (2020-110)

10-Mar-2021 (2021-17)



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o9-Jun-2021 (2021-58)
22-Dec-2021 (2021-85)
05-Jul-2022 (2022-52)
31-Jan-2023 (2022-86)
15-Jun-2023 (2023-58)
13-Dec-2023 (2023-107)
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This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.



Winter Term 2020

(o ECTS credits)



Modul	Module title				Abbreviation
Applica	ations	of Remote Sensing in Ge	ography		04-Geo-FERNA-152-m01
Module coordinator Module off			Module offered by		
holder	of the	Professorship of Remote	Sensing	Institute of Geogra	phy and Geology
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	undergraduate			
Conter	nts		•		
topics atmos cation	are and pheric of and ch	alogue, visual image inte correction. A focus lies or ange detection. Furthern	rpretation, digital imanth the digital remote se	age processing (calib ensing based mappi	ion systems) is given. Following bration, transformation, filter) and ing, i.e. spectral analysis, classifi- ng parameters is conveyed.
Intend	ed lear	ning outcomes			
reflect	their es	ssential characteristics.	They summarise fund	amental aspects of (ey explain geographical data and (digital) image processing and asdata for geographical questions.
Course	S (type, i	number of weekly contact hours,	language — if other than Ge	rman)	
V (2) +	` '				
		t in: German and/or Eng			
		sessment (type, scope, langua ble for bonus)	age — if other than German,	examination offered — if n	ot every semester, information on whether
Langua		nation (approx. 45 minut ssessment: German and bonus			
Allocation of places					
Additio	onal inf	ormation			
Worklo	oad				
150 h					

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$



Module	e title				Abbreviation	
Introduction to Geographical Remote Sensing 04-Geo-FERNE-152-mo1					04-Geo-FERNE-152-m01	
Module	e coord	linator		Module offered by		
holder	of the	Professorship of Remo	te Sensing	Institute of Geograpl	hy and Geology	
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites	•		
1 seme	ster	undergraduate				
Conten	its					
sensing - surfact ant tent and act	g / phyces, ob peratu tive sys	sical principles (energy jects under investigation ure, emissivity / detector	y and radiation, interace on: soils, vegetation, wors: characterisation of ral and LiDAR) / radar re	tions radiation - atmo ater) / thermal remote remote sensing data,	etical basics, history of remote sphere, interactions radiation e sensing: radiation laws, radiplatforms and sensors (passivinterferometry / basics for re-	
Intend	ed lear	ning outcomes				
The students describe basics of earth observation. They outline and explain the radiation path through the atmosphere to the object under investigation and back to the sensor. They emphasise essential characteristics of remote sensing data, sensors and platforms.						
Courses (type, number of weekly contact hours, language — if other than German)						
V (2) + T (2)						
		it in: German and/or Er	1. 1			

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination of fered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination of fered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language})$

module is creditable for bonus)

written examination (approx. 45 minutes) Language of assessment: German and/or English

creditable for bonus

Allocation of places

Additional information

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)

§ 66 I Nr. 2



Module title					Abbreviation
Remot	e Sensi	ing in Resource Manag	ement		04-Geo-FIR-152-m01
Module coordinator				Module offered by	
holder	of the	Professorship of Remo	te Sensing	Institute of Geography and Geology	
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)	
5	nume	rical grade			
Durati	Duration Module level		Other prerequisite	Other prerequisites	
1 seme	1 semester undergraduate				
Contar	Contents				

Against the background of geographical questions, the spectrum of opportunities for remote sensing technologies is developed within this module. According to the student's topic choices, different aspects of remote sensing for the monitoring of environmentally relevant processes in the oceans, the atmosphere and on the land surface are examined, including: Urban applications such as urban growth and urban climate, whereby land surface parameters such as imperviousness and thermal extinction of surfaces are further deepened / remote sensing for environmental monitoring, such as assessment and long-term observation of conventions, support of tasks of nature conservation like habitat designation by modelling of species distributions / remote sensing in health management / hydrological applications of remote sensing such as parameters for modelling run-off in drainage areas or flood mapping and water masks / agricultural applications from crop mapping through extensive growth monitoring and drought forecasts to precision farming. For the respective fields of application, relevant parameters are presented in detail and the spectrum of methods is deduced.

Intended learning outcomes

The students describe, illustrate, explain, and question third party's research results in remote sensing for the first time and evaluate the value of earth observation for answering geographical research questions.

Courses (type, number of weekly contact hours, language — if other than German)

S(2)

Module taught in: German and/or English

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Module title Methods for Analysing Remote Sensing Data					Abbreviation	
					04-Geo-MFD-152-m01	
Module coordinator				М	Module offered by	
holder	holder of the Professorship of Remote Sensing			In	Institute of Geography and Geology	
ECTS	Meth	od of grading	Only after succ	c. compl	of module(s)	
5	nume	rical grade				
Duration Module level Ot		Other prerequi	Other prerequisites			
1 semester undergraduate						
Conte	ntc	•	•			

This module essentially conveys methodological basics: geometric corrections / radiometric corrections (calculation of reflectances, atmospheric correction and correction of viewing and illumination angles) / spatial and spectral filters / image enhancement for visual image interpretation / analysis of spectral profiles / information extraction (rationing, indices, transformations) / classification of remote sensing data and accuracy assessment / pixel based vs. object-oriented analysis / multi-temporal data analysis (time series generation, change detection) / joint usage of remote sensing data with other geoinformation in geographical information systems (raster and vector data).

Intended learning outcomes

The students apply fundamental methods for the processing and analysis of mainly optical earth observation data. They create maps from remotes sensing data self-reliantly and interpret the results.

Courses (type, number of weekly contact hours, language — if other than German)

S(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Module title					Abbreviation
Scient	ific Wri	ting and Presentation Sk	5	04-Geo-WAG-152-m01	
Module coordinator Module off				Module offered by	
holder Scienc		Professorship of Geograp	hy and Regional	Institute of Geogra	phy and Geology
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
5	(not)	successfully completed			
Durati	on	Module level	Other prerequisites	5	
1 seme	ester	undergraduate			
Conte	nts				
		be provided with basics or iting of scientific texts a			udes dealing with literature, conversity style.
Intend	ed lear	ning outcomes			
fic text	ts and o		ation adequate work	ing techniques as w	he fundamental design of scientivell as the necessary information
T (2)	(type, i	iumber of weekly contact flours,	- I other than de	illially	
. ,	e taugh	t in: German and/or Engl	ish		
		sessment (type, scope, langua ole for bonus)	nge — if other than German,	examination offered $-$ if n	not every semester, information on whether
Langua		with or without slides (apussessment: German and bonus			
Alloca	tion of	places			
Additi	onal inf	ormation			
Workload					
150 h			_		
Teachi	ing cycl	e			
Referr	ed to in	LPO I (examination regulation	s for teaching-degree progra	ammes)	



Summer Term 2021

(o ECTS credits)



Module title Abbreviation					Abbreviation
Applic	ations	of Remote Sensing in Ge	ography		04-Geo-FERNA-152-m01
Module coordinator Module o				Module offered by	
holder	of the	Professorship of Remote	Sensing	Institute of Geogra	phy and Geology
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites	;	
1 seme	ester	undergraduate			
Conter	nts		•		
graphi topics atmos	cal data are ana pheric (a, metadata, spatial over alogue, visual image inte correction. A focus lies or	laying of geodata, geor pretation, digital iman the digital remote so	ographical informati age processing (calil ensing based mappi	er geoinformation in general (geo- ion systems) is given. Following pration, transformation, filter) and ing, i.e. spectral analysis, classifi- ng parameters is conveyed.
Intend	ed lear	ning outcomes			
reflect	their e	ssential characteristics. 1	hey summarise fund	amental aspects of (ey explain geographical data and (digital) image processing and asdata for geographical questions.
Course	es (type,	number of weekly contact hours,	language — if other than Ge	rman)	
V (2) + Modul		t in: German and/or Engl	lish		
		sessment (type, scope, langua ble for bonus)	age — if other than German,	examination offered — if n	ot every semester, information on whether
Langua		nation (approx. 45 minut issessment: German and bonus			
Allocation of places					
					
Additio	onal inf	ormation			
Worklo	oad				
150 h	_				

Teaching cycle

 $\textbf{Referred to in LPO I } \ (\text{examination regulations for teaching-degree programmes})$



Module	e title				Abbreviation
Introdu	ıction t	o Geographical Remot	e Sensing		04-Geo-FERNE-152-m01
Module	e coord	linator		Module offered by	
holder	of the	Professorship of Remot	te Sensing	Institute of Geogra	phy and Geology
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisite	S	
1 seme	ster	undergraduate			
Conten	its				
sensing - surfact ant tent and act	g / phyces, ob peratu tive sys	sical principles (energy jects under investigation ure, emissivity / detector	y and radiation, interaction; works; soils, vegetation, wors: characterisation or all and LiDAR) / radar r	ctions radiation - atm vater) / thermal remo f remote sensing data	pretical basics, history of remote osphere, interactions radiation te sensing: radiation laws, radia, platforms and sensors (passivar interferometry / basics for re-
Intend	ed lear	ning outcomes			
The students describe basics of earth observation. They outline and explain the radiation path through the atmosphere to the object under investigation and back to the sensor. They emphasise essential characteristics of remote sensing data, sensors and platforms.					
Courses (type, number of weekly contact hours, language — if other than German)					
V (2) + T (2)					
		ıt in: German and/or Er			

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination of fered} - \textbf{if not every semester, information on whether} \ \\$

written examination (approx. 45 minutes)

Language of assessment: German and/or English

creditable for bonus

module is creditable for bonus)

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

§ 66 I Nr. 2



Module title					Abbreviation	
Remot	e Sensi	ing in Resource Mana	gement		04-Ge0-FIR-152-m01	
Module coordinator				Module offered by	1	
holder	holder of the Professorship of Remote Sensing			Institute of Geogra	Institute of Geography and Geology	
ECTS	Meth	od of grading	Only after succ. o	ompl. of module(s)		
5	nume	rical grade				
Duration Module level		Other prerequisit	Other prerequisites			
1 seme	1 semester undergraduate					
Conte	Contents					

Against the background of geographical questions, the spectrum of opportunities for remote sensing technologies is developed within this module. According to the student's topic choices, different aspects of remote sensing for the monitoring of environmentally relevant processes in the oceans, the atmosphere and on the land surface are examined, including: Urban applications such as urban growth and urban climate, whereby land surface parameters such as imperviousness and thermal extinction of surfaces are further deepened / remote sensing for environmental monitoring, such as assessment and long-term observation of conventions, support of tasks of nature conservation like habitat designation by modelling of species distributions / remote sensing in health management / hydrological applications of remote sensing such as parameters for modelling run-off in drainage areas or flood mapping and water masks / agricultural applications from crop mapping through extensive growth monitoring and drought forecasts to precision farming. For the respective fields of application, relevant parameters are presented in detail and the spectrum of methods is deduced.

Intended learning outcomes

The students describe, illustrate, explain, and question third party's research results in remote sensing for the first time and evaluate the value of earth observation for answering geographical research questions.

Courses (type, number of weekly contact hours, language — if other than German)

S(2)

Module taught in: German and/or English

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Module title				Abbreviation	
Methods for Analysing Remote Sensing Data					04-Geo-MFD-152-m01
Modul	e coord	inator		Module offered by	
holder	of the I	Professorship of Remot	e Sensing	Institute of Geography and Geology	
ECTS	Metho	od of grading	Only after succ. con	compl. of module(s)	
5	nume	rical grade			
Duratio	Duration Module level		Other prerequisites	Other prerequisites	
1 seme	1 semester undergraduate				
Conter	Contents				

This module essentially conveys methodological basics: geometric corrections / radiometric corrections (calculation of reflectances, atmospheric correction and correction of viewing and illumination angles) / spatial and spectral filters / image enhancement for visual image interpretation / analysis of spectral profiles / information extraction (rationing, indices, transformations) / classification of remote sensing data and accuracy assessment / pixel based vs. object-oriented analysis / multi-temporal data analysis (time series generation, change detection) / joint usage of remote sensing data with other geoinformation in geographical information systems (raster and vector data).

Intended learning outcomes

The students apply fundamental methods for the processing and analysis of mainly optical earth observation data. They create maps from remotes sensing data self-reliantly and interpret the results.

 $\textbf{Courses} \ (\textbf{type}, \textbf{number of weekly contact hours}, \textbf{language} - \textbf{if other than German})$

S(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title Abbreviation					
Scienti	fic Writ	ing and Presentation Sk	ills in Earth Sciences	;	04-Geo-WAG-152-m01
Module	Module coordinator M				/
holder Science		Professorship of Geograp	hy and Regional	Institute of Geogra	aphy and Geology
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)	
5	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites	•	
1 seme	ster	undergraduate			
Conten	ts				
		be provided with basics oriting of scientific texts a		. ,	ludes dealing with literature, conversity style.
Intende	ed learı	ning outcomes			
Course	tence.	ral presentations, applic	·		vell as the necessary information
T (2) Module	e taugh	t in: German and/or Engl	ish		
		sessment (type, scope, langua le for bonus)	${\sf ge-if}$ other than German,	examination offered — if r	not every semester, information on whether
	ige of a	vith or without slides (ap ssessment: German and bonus			
Allocat	ion of p	olaces			
	1				
Additio	nal inf	ormation			
Workload					
150 h					
Teaching cycle					
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ammes)	



Winter Term 2021

(o ECTS credits)



Module title Abbreviation				
Applications of Remote Sensing in Geography 04-Geo-FERNA-152-mo1				
Module coordinator		Module offered by		
holder of the Professorship of Remote	e Sensing	Institute of Geogra	phy and Geology	
ECTS Method of grading	Only after succ. con	npl. of module(s)		
5 numerical grade				
Duration Module level	Other prerequisites	1		
1 semester undergraduate				
Contents	,			
graphical data, metadata, spatial over topics are analogue, visual image into atmospheric correction. A focus lies of cation and change detection. Further Intended learning outcomes The students explain applications of reflect their essential characteristics. sess different methodological approautourses (type, number of weekly contact hours V (2) + T (2) Module taught in: German and/or English and the serious contact in the seriou	erpretation, digital image on the digital remote some, basics in model earth observation and They summarise fundaches for the evaluation, language — if other than Genglish	age processing (calit ensing based mappi ling of remote sension remote sensing. The amental aspects of (n of remote sensing	bration, transformation, filter) and ing, i.e. spectral analysis, classifing parameters is conveyed. ey explain geographical data and (digital) image processing and asdata for geographical questions.	
Method of assessment (type, scope, language to be in a second to be a second to b	uage — if other than German,	examination offered — if n	ot every semester, information on whether	
module is creditable for bonus) written examination (approx. 45 minu Language of assessment: German and creditable for bonus				
Allocation of places				
Additional information				
Workload				
150 h				
Teaching cycle				

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$



Module	Module title				Abbreviation
Introdu	ıction t	o Geographical Remote	Sensing		04-Geo-FERNE-152-m01
Module coordinator				Module offered by	
holder	of the	Professorship of Remote	Sensing	Institute of Geogra	phy and Geology
ECTS Method of grading Only after succ. com		npl. of module(s)			
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites	•	
1 seme	ster	undergraduate			
Conten	its	,			
sensing - surfac	g / phy ces, ob	sical principles (energy a jects under investigation	nd radiation, interacts: soils, vegetation, w	tions radiation - atm ater) / thermal remo	oretical basics, history of remote osphere, interactions radiation te sensing: radiation laws, radia, platforms and sensors (passiv

Intended learning outcomes

The students describe basics of earth observation. They outline and explain the radiation path through the atmosphere to the object under investigation and back to the sensor. They emphasise essential characteristics of remote sensing data, sensors and platforms.

and active systems, e.g. hyperspectral and LiDAR) / radar remote sensing / radar interferometry / basics for re-

Courses (type, number of weekly contact hours, language - if other than German)

mote sensing parameters (land, atmosphere, oceans).

V(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 45 minutes)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

--

Additional information

--

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

§ 66 I Nr. 2



Module title					Abbreviation	
Remote Sensing in Resource Management			gement		04-Ge0-FIR-152-m01	
Module coordinator				Module offered by	Module offered by	
holder of the Professorship of Remote Sensing		ote Sensing	Institute of Geogra	Institute of Geography and Geology		
ECTS	Meth	od of grading	Only after succ. o	ompl. of module(s)		
5	nume	rical grade				
Duration Module level		Other prerequisit	Other prerequisites			
1 semester undergraduate						
Conte	nts		<u>.</u>			

Against the background of geographical questions, the spectrum of opportunities for remote sensing technologies is developed within this module. According to the student's topic choices, different aspects of remote sensing for the monitoring of environmentally relevant processes in the oceans, the atmosphere and on the land surface are examined, including: Urban applications such as urban growth and urban climate, whereby land surface parameters such as imperviousness and thermal extinction of surfaces are further deepened / remote sensing for environmental monitoring, such as assessment and long-term observation of conventions, support of tasks of nature conservation like habitat designation by modelling of species distributions / remote sensing in health management / hydrological applications of remote sensing such as parameters for modelling run-off in drainage areas or flood mapping and water masks / agricultural applications from crop mapping through extensive growth monitoring and drought forecasts to precision farming. For the respective fields of application, relevant parameters are presented in detail and the spectrum of methods is deduced.

Intended learning outcomes

The students describe, illustrate, explain, and question third party's research results in remote sensing for the first time and evaluate the value of earth observation for answering geographical research questions.

Courses (type, number of weekly contact hours, language — if other than German)

S(2)

Module taught in: German and/or English

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Modul	e title		Abbreviation		
Metho	Methods for Analysing Remote Sensing Data			04-Geo-MFD-152-m01	
Module coordinator				Module offered by	
holder of the Professorship of Remote Sensing		e Sensing	Institute of Geography and Geology		
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)	
5	nume	rical grade			
Duration Module level Ot		Other prerequisites	Other prerequisites		
1 semester undergraduate					
Conter	nts				

This module essentially conveys methodological basics: geometric corrections / radiometric corrections (calculation of reflectances, atmospheric correction and correction of viewing and illumination angles) / spatial and spectral filters / image enhancement for visual image interpretation / analysis of spectral profiles / information extraction (rationing, indices, transformations) / classification of remote sensing data and accuracy assessment / pixel based vs. object-oriented analysis / multi-temporal data analysis (time series generation, change detection) / joint usage of remote sensing data with other geoinformation in geographical information systems (raster and vector data).

Intended learning outcomes

The students apply fundamental methods for the processing and analysis of mainly optical earth observation data. They create maps from remotes sensing data self-reliantly and interpret the results.

Courses (type, number of weekly contact hours, language — if other than German)

S(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module	e title	,		,	Abbreviation
Scienti	fic Writ	ing and Presentation Sk	ills in Earth Sciences	;	04-Geo-WAG-152-m01
Module	e coord	inator		Module offered by	L
holder Science		Professorship of Geograp	hy and Regional	Institute of Geogra	phy and Geology
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
5	(not)	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
l		be provided with basics oriting of scientific texts a		• , ,	udes dealing with literature, conversity style.
Intend	ed learı	ning outcomes			
fic text compe	s and o tence.		ation adequate work	ing techniques as w	ne fundamental design of scienti- ell as the necessary information
T (2)		•			
		t in: German and/or Engl	•	examination offered — if n	ot every semester, information on whether
		le for bonus)	,		, , , , , , , , , , , , , , , , , , , ,
	ige of a	with or without slides (ap ssessment: German and bonus			
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	ammes)	



Summer Term 2022

(o ECTS credits)



Module title Abbreviation				
Applications of Remote Sensing in Geography 04-Geo-FERNA-152-mo1				
Module coordinator		Module offered by		
holder of the Professorship of Remote	e Sensing	Institute of Geogra	phy and Geology	
ECTS Method of grading	Only after succ. con	npl. of module(s)		
5 numerical grade				
Duration Module level	Other prerequisites	1		
1 semester undergraduate				
Contents	,			
graphical data, metadata, spatial over topics are analogue, visual image into atmospheric correction. A focus lies of cation and change detection. Further Intended learning outcomes The students explain applications of reflect their essential characteristics. sess different methodological approautourses (type, number of weekly contact hours V (2) + T (2) Module taught in: German and/or English and the serious contact in the seriou	erpretation, digital image on the digital remote some, basics in model earth observation and They summarise fundaches for the evaluation, language — if other than Genglish	age processing (calit ensing based mappi ling of remote sension remote sensing. The amental aspects of (n of remote sensing	bration, transformation, filter) and ing, i.e. spectral analysis, classifing parameters is conveyed. ey explain geographical data and (digital) image processing and asdata for geographical questions.	
Method of assessment (type, scope, language to be in a second to be a second to b	uage — if other than German,	examination offered — if n	ot every semester, information on whether	
module is creditable for bonus) written examination (approx. 45 minu Language of assessment: German and creditable for bonus				
Allocation of places				
Additional information				
Workload				
150 h				
Teaching cycle				

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$



VV	UKZBU	oko Pisa	5 (23, 24) 8	33 0 2 19	
Module	e title			Abbreviation	
Introdu	ıction t	o Geographical Remote S	Sensing		04-Geo-FERNE-152-m01
Module	e coord	inator		Module offered by	
holder	of the	Professorship of Remote	Sensing	Institute of Geograp	ohy and Geology
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
ant tem	nperatu tive sys	ire, emissivity / detectors	s: characterisation of and LiDAR) / radar re	remote sensing data	te sensing: radiation laws, radia, platforms and sensors (passivar interferometry / basics for re-
		ning outcomes			
sphere	to the		n and back to the se		radiation path through the atmo e essential characteristics of re-
Course	S (type, i	number of weekly contact hours, I	anguage — if other than Ger	man)	
V (2) + Module	. ,	t in: German and/or Engl	ish		
		Sessment (type, scope, langua	ge — if other than German,	examination offered — if no	ot every semester, information on whether
written	exami	nation (approx. 45 minut	es)		

creditable for bonus

Language of assessment: German and/or English

Additional information

Allocation of places

Workload

150 h

Teaching cycle

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 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

§ 66 I Nr. 2



Module title				Abbreviation	
Remote Sensing in Resource Management			ement		04-Geo-FIR-152-m01
Module coordinator				Module offered by	
holder of the Professorship of Remote Sensing		te Sensing	Institute of Geography and Geology		
ECTS	Meth	od of grading	Only after succ. co	ompl. of module(s)	
5	nume	rical grade			
Duration Module level O		Other prerequisite	Other prerequisites		
1 semester undergraduate					
Conter	ntc.		,		

Against the background of geographical questions, the spectrum of opportunities for remote sensing technologies is developed within this module. According to the student's topic choices, different aspects of remote sensing for the monitoring of environmentally relevant processes in the oceans, the atmosphere and on the land surface are examined, including: Urban applications such as urban growth and urban climate, whereby land surface parameters such as imperviousness and thermal extinction of surfaces are further deepened / remote sensing for environmental monitoring, such as assessment and long-term observation of conventions, support of tasks of nature conservation like habitat designation by modelling of species distributions / remote sensing in health management / hydrological applications of remote sensing such as parameters for modelling run-off in drainage areas or flood mapping and water masks / agricultural applications from crop mapping through extensive growth monitoring and drought forecasts to precision farming. For the respective fields of application, relevant parameters are presented in detail and the spectrum of methods is deduced.

Intended learning outcomes

The students describe, illustrate, explain, and question third party's research results in remote sensing for the first time and evaluate the value of earth observation for answering geographical research questions.

Courses (type, number of weekly contact hours, language — if other than German)

S(2)

Module taught in: German and/or English

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Modul	e title		Abbreviation		
Metho	Methods for Analysing Remote Sensing Data			04-Geo-MFD-152-m01	
Module coordinator				Module offered by	
holder of the Professorship of Remote Sensing		e Sensing	Institute of Geography and Geology		
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)	
5	nume	rical grade			
Duration Module level Ot		Other prerequisites	Other prerequisites		
1 semester undergraduate					
Conter	nts				

This module essentially conveys methodological basics: geometric corrections / radiometric corrections (calculation of reflectances, atmospheric correction and correction of viewing and illumination angles) / spatial and spectral filters / image enhancement for visual image interpretation / analysis of spectral profiles / information extraction (rationing, indices, transformations) / classification of remote sensing data and accuracy assessment / pixel based vs. object-oriented analysis / multi-temporal data analysis (time series generation, change detection) / joint usage of remote sensing data with other geoinformation in geographical information systems (raster and vector data).

Intended learning outcomes

The students apply fundamental methods for the processing and analysis of mainly optical earth observation data. They create maps from remotes sensing data self-reliantly and interpret the results.

Courses (type, number of weekly contact hours, language — if other than German)

S(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module	Module title Abbreviation						
Scienti	Scientific Writing and Presentation Skills in Earth Sciences 04-Geo-WAG-152-mo1						
Module	e coordi	inator		Module offered by			
holder	of the F	Professorship of Geograp	hy and Regional	Institute of Geograp	ohy and Geology		
Science							
ECTS		od of grading	Only after succ. con	npl. of module(s)			
5	<u> </u>	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
		pe provided with basics of the provided with basics of scientific texts a			des dealing with literature, conersity style.		
Intende	ed learr	ning outcomes					
1	s and o				e fundamental design of scienti- ell as the necessary information		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Gei	rman)			
T (2) Module	e taugh	t in: German and/or Engl	ish				
		essment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
Langua		vith or without slides (ap ssessment: German and, bonus					
Allocat	ion of p	laces					
Additio	nal info	ormation					
Workload							
150 h							
Teaching cycle							
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						



Winter Term 2022

(o ECTS credits)



Module title Abbreviation				
Applications of Remote Sensing in Geography 04-Geo-FERNA-152-mo1				
Module coordinator		Module offe	ered by	
holder of the Professorship o	f Remote Sensing	Institute of	Geography and Geology	
ECTS Method of grading	Only after succ	c. compl. of modul	e(s)	
5 numerical grade				
Duration Module level	Other prerequi	isites		
1 semester undergraduate	<u></u>			
Contents				
topics are analogue, visual in atmospheric correction. A focation and change detection. Intended learning outcomes The students explain applicareflect their essential charact sess different methodological Courses (type, number of weekly convolute to the convol	nage interpretation, digital rem it is lies on the digital rem Furthermore, basics in mutions of earth observation eristics. They summarise approaches for the evaluated hours, language — if other the id/or English	al image processing to the sensing based modelling of remote and remote sens fundamental aspetuation of remote sens than German)	formation systems) is given. Following g (calibration, transformation, filter) and mapping, i.e. spectral analysis, classifice sensing parameters is conveyed. ing. They explain geographical data and ects of (digital) image processing and assensing data for geographical questions.	
Method of assessment (type, s module is creditable for bonus)	cope, language — if other than Ge	erman, examination offe	${\sf red}-{\sf if}$ not every semester, information on whether	
written examination (approx. Language of assessment: Geo creditable for bonus				
Allocation of places				
Additional information				
Workload				
150 h				



Module	e title			Abbreviation
Introdu	ıction t	o Geographical Remot	e Sensing	04-Geo-FERNE-152-m01
Module	e coord	linator		Module offered by
holder	of the	Professorship of Remot	e Sensing	Institute of Geography and Geology
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)
5	nume	rical grade		
Duratio	on	Module level	Other prerequisites	5
1 seme	ster	undergraduate		
Conten	its			
sensing - surfact ant tent and act	g / phyces, ob peratu tive sys	sical principles (energy jects under investigation ure, emissivity / detector	and radiation, interacon: son: soils, vegetation, wors: characterisation of al and LiDAR) / radar re	ensing, that are: theoretical basics, history of remote tions radiation - atmosphere, interactions radiation ater) / thermal remote sensing: radiation laws, radi- fremote sensing data, platforms and sensors (passive mote sensing / radar interferometry / basics for re-
Intend	ed lear	ning outcomes		
sphere	to the		tion and back to the se	tline and explain the radiation path through the atm ensor. They emphasise essential characteristics of re
Course	S (type, i	number of weekly contact hour	s, language — if other than Ge	rman)
V (2) +	. ,	t in: German and/or En	ali ala	

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination of fered} - \textbf{if not every semester, information on whether} \ \\$

module is creditable for bonus)
written examination (approx. 45 minutes)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

§ 66 I Nr. 2



Module	e title		Abbreviation				
Remot	e Sensi	ng in Resource Manager	ment		04-Geo-FIR-152-m01		
Module coordinator				Module offered by			
holder of the Professorship of Remote Sensing			Sensing	Institute of Geography and Geology			
ECTS	Meth	od of grading Only after succ. con		npl. of module(s)			
5	nume	erical grade					
Duration Module level		Other prerequisites					
1 semester		undergraduate					
Contents							

Against the background of geographical questions, the spectrum of opportunities for remote sensing technologies is developed within this module. According to the student's topic choices, different aspects of remote sensing for the monitoring of environmentally relevant processes in the oceans, the atmosphere and on the land surface are examined, including: Urban applications such as urban growth and urban climate, whereby land surface parameters such as imperviousness and thermal extinction of surfaces are further deepened / remote sensing for environmental monitoring, such as assessment and long-term observation of conventions, support of tasks of nature conservation like habitat designation by modelling of species distributions / remote sensing in health management / hydrological applications of remote sensing such as parameters for modelling run-off in drainage areas or flood mapping and water masks / agricultural applications from crop mapping through extensive growth monitoring and drought forecasts to precision farming. For the respective fields of application, relevant parameters are presented in detail and the spectrum of methods is deduced.

Intended learning outcomes

The students describe, illustrate, explain, and question third party's research results in remote sensing for the first time and evaluate the value of earth observation for answering geographical research questions.

Courses (type, number of weekly contact hours, language — if other than German)

S(2)

Module taught in: German and/or English

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Modul	e title		Abbreviation				
Metho	ds for A	Analysing Remote Sens	ing Data		04-Geo-MFD-152-m01		
Modul	e coord	inator		Module offered by			
holder of the Professorship of Remote Sensing			e Sensing	Institute of Geography and Geology			
ECTS	Metho	hod of grading Only after succ.		mpl. of module(s)			
5	nume	rical grade					
Duration Module level		Other prerequisites					
1 semester		undergraduate					
Contents							

This module essentially conveys methodological basics: geometric corrections / radiometric corrections (calculation of reflectances, atmospheric correction and correction of viewing and illumination angles) / spatial and spectral filters / image enhancement for visual image interpretation / analysis of spectral profiles / information extraction (rationing, indices, transformations) / classification of remote sensing data and accuracy assessment / pixel based vs. object-oriented analysis / multi-temporal data analysis (time series generation, change detection) / joint usage of remote sensing data with other geoinformation in geographical information systems (raster and vector data).

Intended learning outcomes

The students apply fundamental methods for the processing and analysis of mainly optical earth observation data. They create maps from remotes sensing data self-reliantly and interpret the results.

Courses (type, number of weekly contact hours, language — if other than German)

S(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Modul	e title		Abbreviation				
Scienti	ific Writ	ting and Presentation Sk	;	04-Geo-WAG-152-m01			
Modul	e coord	inator		Module offered by			
holder of the Professorship of Geography and Regional Science			hy and Regional	Institute of Geography and Geology			
ECTS	Metho	od of grading	Only after succ. compl. of module(s)				
5	(not)	successfully completed					
Duration Module le		Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ıts						
	Students will be provided with basics of scientific work in Geography: This includes dealing with literature, conception and writing of scientific texts as well as being able to present in an university style.						
Intend	ed lear	ning outcomes					
Students achieve basics concerning methods of scientific work. This refers to the fundamental design of scientific texts and oral presentations, application adequate working techniques as well as the necessary information competence.							
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ge	rman)			
T (2) Modul	T (2) Module taught in: German and/or English						
		sessment (type, scope, langua le for bonus)	${\sf ge-if}$ other than German,	examination offered — if no	ot every semester, information on whether		
Langua	presentation with or without slides (approx. 30 minutes) Language of assessment: German and/or English creditable for bonus						
Allocat	tion of p	olaces					
Additional information							
Workload							
150 h							
Teaching cycle							
							
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ammes)			



Summer Term 2023

(o ECTS credits)



Module	e title				Abbreviation
Applications of Remote Sensing in Geography					04-Geo-FERNA-152-m01
Module	e coord	inator		Module o	ffered by
holder	of the I	Professorship of Remo	te Sensing	Institute	of Geography and Geology
ECTS	Meth	od of grading	Only after suc	c. compl. of mod	lule(s)
5	nume	rical grade			
Duratio	on	Module level	Other prerequ	iisites	
1 seme	ster	undergraduate			
Conten	ıts		,		
atmosp cation	oheric o and ch	correction. A focus lies ange detection. Furthe	on the digital rem	note sensing bas	sing (calibration, transformation, filter) ar ed mapping, i.e. spectral analysis, classif ote sensing parameters is conveyed.
		ning outcomes			
reflect	their es	ssential characteristic	s. They summarise	fundamental as	nsing. They explain geographical data and spects of (digital) image processing and a e sensing data for geographical questions
Course	S (type, r	number of weekly contact hou	ırs, language — if other t	than German)	
V (2) + Module		t in: German and/or E	nglish		
		sessment (type, scope, lar ble for bonus)	guage — if other than G	erman, examination o	${\sf ffered}-{\sf if}$ not every semester, information on whether
written	exami	nation (approx. 45 mir	nutes)		
		issessment: German a			

creditable for bonus Allocation of places

Additional information

Workload

150 h

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$



Module title Abbreviation						
Introdu	ction t	o Geographical Remote	Sensing		04-Geo-FERNE-152-m01	
Module	coord	inator		Module offered by	'	
holder (of the F	Professorship of Remote	e Sensing	Institute of Geogra	phy and Geology	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semes	ster	undergraduate				
Content	ts					
- surfac ant tem and act	es, obj peratu ive sys	jects under investigation are, emissivity / detector	n: soils, vegetation, wa rs: characterisation of Il and LiDAR) / radar re	ater) / thermal remo remote sensing dat	nosphere, interactions radiation ote sensing: radiation laws, radiation laws, radia, platforms and sensors (passive ar interferometry / basics for re-	
Intende	d lear	ning outcomes				
sphere	to the		on and back to the se		e radiation path through the atmo se essential characteristics of re-	
Courses (type, number of weekly contact hours, language — if other than German)						
V (2) + T (2) Module taught in: German and/or English						
		t in: German and/or Eng	glish			

written examination (approx. 45 minutes)

Language of assessment: German and/or English

creditable for bonus

module is creditable for bonus)

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

§ 66 I Nr. 2



Module title					Abbreviation	
Remote Sensing in Resource Management					04-Geo-FIR-152-m01	
Modul	e coord	inator		Module offered by	1	
holder	holder of the Professorship of Remote Sensing			Institute of Geography and Geology		
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)		
5	nume	rical grade				
Duration Module level		Other prerequisite	Other prerequisites			
1 seme	1 semester undergraduate					
Contar	Contents					

Against the background of geographical questions, the spectrum of opportunities for remote sensing technologies is developed within this module. According to the student's topic choices, different aspects of remote sensing for the monitoring of environmentally relevant processes in the oceans, the atmosphere and on the land surface are examined, including: Urban applications such as urban growth and urban climate, whereby land surface parameters such as imperviousness and thermal extinction of surfaces are further deepened / remote sensing for environmental monitoring, such as assessment and long-term observation of conventions, support of tasks of nature conservation like habitat designation by modelling of species distributions / remote sensing in health management / hydrological applications of remote sensing such as parameters for modelling run-off in drainage areas or flood mapping and water masks / agricultural applications from crop mapping through extensive growth monitoring and drought forecasts to precision farming. For the respective fields of application, relevant parameters are presented in detail and the spectrum of methods is deduced.

Intended learning outcomes

The students describe, illustrate, explain, and question third party's research results in remote sensing for the first time and evaluate the value of earth observation for answering geographical research questions.

Courses (type, number of weekly contact hours, language — if other than German)

S(2)

Module taught in: German and/or English

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Module title					Abbreviation	
Methods for Analysing Remote Sensing Data					04-Geo-MFD-152-m01	
Module coordinator				Module offered by	d by	
holder	of the	Professorship of Remot	e Sensing	Institute of Geography and Geology		
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)		
5	nume	rical grade				
Duration Module level		Other prerequisites	Other prerequisites			
1 seme	1 semester undergraduate					
Contar	Contents					

This module essentially conveys methodological basics: geometric corrections / radiometric corrections (calculation of reflectances, atmospheric correction and correction of viewing and illumination angles) / spatial and spectral filters / image enhancement for visual image interpretation / analysis of spectral profiles / information extraction (rationing, indices, transformations) / classification of remote sensing data and accuracy assessment / pixel based vs. object-oriented analysis / multi-temporal data analysis (time series generation, change detection) / joint usage of remote sensing data with other geoinformation in geographical information systems (raster and vector data).

Intended learning outcomes

The students apply fundamental methods for the processing and analysis of mainly optical earth observation data. They create maps from remotes sensing data self-reliantly and interpret the results.

Courses (type, number of weekly contact hours, language — if other than German)

S(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Module	Module title Abbreviation						
Scienti	fic Writ	ing and Presentation Sk	ills in Earth Sciences	· · · · · · · · · · · · · · · · · · ·	04-Geo-WAG-152-m01		
Module	Module coordinator Module offered by						
holder	of the F	Professorship of Geograp	hy and Regional	Institute of Geograp	ohy and Geology		
Science							
ECTS		od of grading	Only after succ. con	npl. of module(s)			
5	<u> </u>	successfully completed					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
		pe provided with basics of the provided with basics of scientific texts a			des dealing with literature, conersity style.		
Intende	ed learr	ning outcomes					
1	s and o				e fundamental design of scienti- ell as the necessary information		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Gei	rman)			
T (2) Module	e taugh	t in: German and/or Engl	ish				
		essment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
Langua		vith or without slides (ap ssessment: German and, bonus					
Allocat	ion of p	laces					
Additio	nal info	ormation					
Worklo	Workload						
150 h	150 h						
Teachi	Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						



Winter Term 2023

(o ECTS credits)



Modul	Module title Abbreviation						
Applications of Remote Sensing in Geography					04-Geo-FERNA-152-m01		
Modul	e coord	inator		Module offered by	Į.		
holder	of the I	Professorship of Remote	Sensing	Institute of Geograp	phy and Geology		
ECTS	Meth	od of grading	Only after succ. con	ıpl. of module(s)			
5	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conter	nts						
cation	and ch				ng, i.e. spectral analysis, classifing parameters is conveyed.		
reflect	their es	ssential characteristics. 1	hey summarise fund	amental aspects of (ey explain geographical data and (digital) image processing and as data for geographical questions.		
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	man)			
V (2) + T (2) Module taught in: German and/or English							
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)							
written examination (approx. 45 minutes) Language of assessment: German and/or English creditable for bonus							

creditable for bonus

Allocation of places

Additional information

Workload

150 h

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$



VV	UKZBU	JRG PICE	5 (23, 24) 8	33 0 2 19				
Module	Module title Abbreviation							
Introdu	ıction t	o Geographical Remote S	Sensing		04-Geo-FERNE-152-m01			
Module	e coord	inator		Module offered by				
holder	of the	Professorship of Remote	Sensing	Institute of Geograp	ohy and Geology			
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)				
5	nume	rical grade						
Duratio	on	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	ts							
ant tem	nperatu tive sys	ire, emissivity / detectors	s: characterisation of and LiDAR) / radar re	remote sensing data	te sensing: radiation laws, radia, platforms and sensors (passivar interferometry / basics for re-			
		ning outcomes						
sphere	to the		n and back to the se		radiation path through the atmo e essential characteristics of re-			
Course	S (type, i	number of weekly contact hours, I	anguage — if other than Ger	man)				
	V (2) + T (2) Module taught in: German and/or English							
	Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)							
written	exami	nation (approx. 45 minut	es)					

creditable for bonus

Language of assessment: German and/or English

Allocation of places

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Additional information

Workload

150 h

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

§ 66 I Nr. 2



Module title					Abbreviation	
Remote Sensing in Resource Management					04-Ge0-FIR-152-m01	
Module coordinator				Module offered by	y	
holder	holder of the Professorship of Remote Sensing			Institute of Geography and Geology		
ECTS	Meth	od of grading	Only after succ. o	ompl. of module(s)		
5	nume	rical grade				
Duration Module level		Other prerequisit	Other prerequisites			
1 seme	1 semester undergraduate					
Conte	Contents					

Against the background of geographical questions, the spectrum of opportunities for remote sensing technologies is developed within this module. According to the student's topic choices, different aspects of remote sensing for the monitoring of environmentally relevant processes in the oceans, the atmosphere and on the land surface are examined, including: Urban applications such as urban growth and urban climate, whereby land surface parameters such as imperviousness and thermal extinction of surfaces are further deepened / remote sensing for environmental monitoring, such as assessment and long-term observation of conventions, support of tasks of nature conservation like habitat designation by modelling of species distributions / remote sensing in health management / hydrological applications of remote sensing such as parameters for modelling run-off in drainage areas or flood mapping and water masks / agricultural applications from crop mapping through extensive growth monitoring and drought forecasts to precision farming. For the respective fields of application, relevant parameters are presented in detail and the spectrum of methods is deduced.

Intended learning outcomes

The students describe, illustrate, explain, and question third party's research results in remote sensing for the first time and evaluate the value of earth observation for answering geographical research questions.

Courses (type, number of weekly contact hours, language — if other than German)

S(2)

Module taught in: German and/or English

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Module title					Abbreviation	
Methods for Analysing Remote Sensing Data					04-Geo-MFD-152-m01	
Module coordinator				Module offered by	d by	
holder	of the	Professorship of Remot	e Sensing	Institute of Geography and Geology		
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)		
5	nume	rical grade				
Duration Module level		Other prerequisites	Other prerequisites			
1 seme	1 semester undergraduate					
Contar	Contents					

This module essentially conveys methodological basics: geometric corrections / radiometric corrections (calculation of reflectances, atmospheric correction and correction of viewing and illumination angles) / spatial and spectral filters / image enhancement for visual image interpretation / analysis of spectral profiles / information extraction (rationing, indices, transformations) / classification of remote sensing data and accuracy assessment / pixel based vs. object-oriented analysis / multi-temporal data analysis (time series generation, change detection) / joint usage of remote sensing data with other geoinformation in geographical information systems (raster and vector data).

Intended learning outcomes

The students apply fundamental methods for the processing and analysis of mainly optical earth observation data. They create maps from remotes sensing data self-reliantly and interpret the results.

Courses (type, number of weekly contact hours, language — if other than German)

S(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

Workload

150 h

Teaching cycle



Module	Module title Abbreviation						
Scienti	fic Writ	ing and Presentation Sk	ills in Earth Sciences		04-Geo-WAG-232-m01		
Module	Module coordinator Module offered by						
holder	of the F	Professorship of Geograp	hy and Regional	Institute of Geograp	ohy and Geology		
Science			-				
ECTS		od of grading	Only after succ. con	npl. of module(s)			
5	•	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
		pe provided with basics on the provided with basics of scientific texts a			des dealing with literature, conersity style.		
Intende	ed learı	ning outcomes					
1	s and o				ne fundamental design of scienti- ell as the necessary information		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Gei	rman)			
T (2) Module	e taugh	t in: German and/or Engl	ish				
		eessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
Langua		rox. 15 hours total) ssessment: German and, bonus	or English				
Allocat	ion of p	olaces					
	_						
Additio	nal inf	ormation					
Worklo	Workload						
150 h	150 h						
Teachi	Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						



Summer Term 2024

(o ECTS credits)



Module	e title				Abbreviation	
Applica	Applications of Remote Sensing in Geography 04-Geo-FERNA-152-mo1					
Module	e coord	inator		Module offered by		
holder	of the I	Professorship of Remote	Sensing	Institute of Geogra	phy and Geology	
ECTS	Meth	od of grading	Only after succ. con	ıpl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ıts					
topics atmosp cation	are ana oheric o and ch	alogue, visual image inter correction. A focus lies or	pretation, digital ima the digital remote se	ge processing (calil ensing based mapp	ion systems) is given. Following pration, transformation, filter) and ing, i.e. spectral analysis, classifing parameters is conveyed.	
reflect sess di	their es	ssential characteristics. T methodological approac	hey summarise funda hes for the evaluatio	amental aspects of nof remote sensing	ey explain geographical data and (digital) image processing and asdata for geographical questions.	
V (2) +	T (2)	number of weekly contact hours, it in: German and/or Engl		man)		
		sessment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if n	ot every semester, information on whether	
	ige of a	nation (approx. 45 minut ssessment: German and bonus				
Allocat	ion of _l	places				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	е				



Module title Al					Abbreviation
Introdu	ıction t	o Geographical Remote S	Sensing		04-Geo-FERNE-152-m01
Module	e coord	inator		Module offered by	I.
holder	of the	Professorship of Remote	Sensing	Institute of Geogra	ohy and Geology
ECTS	TS Method of grading Only after succ. comp		npl. of module(s)		
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	its				
sensing - surfac	g / phy ces, ob	sical principles (energy a jects under investigation	nd radiation, interacts: soils, vegetation, w	tions radiation - atm ater) / thermal remo	retical basics, history of remote osphere, interactions radiation te sensing: radiation laws, radia, platforms and sensors (passive

Intended learning outcomes

The students describe basics of earth observation. They outline and explain the radiation path through the atmosphere to the object under investigation and back to the sensor. They emphasise essential characteristics of remote sensing data, sensors and platforms.

and active systems, e.g. hyperspectral and LiDAR) / radar remote sensing / radar interferometry / basics for re-

Courses (type, number of weekly contact hours, language - if other than German)

mote sensing parameters (land, atmosphere, oceans).

V(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 45 minutes)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

§ 66 I Nr. 2



Module	e title		Abbreviation				
Remot	e Sensi	ng in Resource Manage	ement		04-Geo-FIR-152-m01		
Module coordinator				Module offered by			
holder of the Professorship of Remote Sensing			e Sensing	Institute of Geography and Geology			
ECTS	Meth	od of grading Only after succ. co		npl. of module(s)			
5	nume	erical grade					
Duration Module level		Module level	Other prerequisites				
1 semester		undergraduate					
Contents							

Contents

Against the background of geographical questions, the spectrum of opportunities for remote sensing technologies is developed within this module. According to the student's topic choices, different aspects of remote sensing for the monitoring of environmentally relevant processes in the oceans, the atmosphere and on the land surface are examined, including: Urban applications such as urban growth and urban climate, whereby land surface parameters such as imperviousness and thermal extinction of surfaces are further deepened / remote sensing for environmental monitoring, such as assessment and long-term observation of conventions, support of tasks of nature conservation like habitat designation by modelling of species distributions / remote sensing in health management / hydrological applications of remote sensing such as parameters for modelling run-off in drainage areas or flood mapping and water masks / agricultural applications from crop mapping through extensive growth monitoring and drought forecasts to precision farming. For the respective fields of application, relevant parameters are presented in detail and the spectrum of methods is deduced.

Intended learning outcomes

The students describe, illustrate, explain, and question third party's research results in remote sensing for the first time and evaluate the value of earth observation for answering geographical research questions.

Courses (type, number of weekly contact hours, language — if other than German)

S (2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Modul	e title			Abbreviation			
Metho	ds for A	Analysing Remote Sen	sing Data		04-Geo-MFD-152-m01		
Module coordinator				Module offered by			
holder of the Professorship of Remote Sensing				Institute of Geography and Geology			
ECTS	Meth	nod of grading Only after succ. co		mpl. of module(s)			
5	nume	erical grade					
Duration A		Module level	Other prerequisite	Other prerequisites			
1 semester		undergraduate					
Contants							

Contents

This module essentially conveys methodological basics: geometric corrections / radiometric corrections (calculation of reflectances, atmospheric correction and correction of viewing and illumination angles) / spatial and spectral filters / image enhancement for visual image interpretation / analysis of spectral profiles / information extraction (rationing, indices, transformations) / classification of remote sensing data and accuracy assessment / pixel based vs. object-oriented analysis / multi-temporal data analysis (time series generation, change detection) / joint usage of remote sensing data with other geoinformation in geographical information systems (raster and vector data).

Intended learning outcomes

The students apply fundamental methods for the processing and analysis of mainly optical earth observation data. They create maps from remotes sensing data self-reliantly and interpret the results.

Courses (type, number of weekly contact hours, language — if other than German)

S(2) + T(2)

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 45 minutes) with related term paper (approx. 15 pages)

Assessment offered: Once a year, winter semester Language of assessment: German and/or English

Allocation of places

max. 20 places. Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters with the individual student's progression through their degree programme being taken into account. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module title Abbreviation							
Scienti	fic Writ	ing and Presentation Sk		04-Geo-WAG-232-m01			
Module	coord	inator		Module offered by			
holder of the Professorship of Geography and Regional Science				Institute of Geography and Geology			
ECTS	Metho	od of grading	Only after succ. compl. of module(s)				
5	(not) successfully completed						
Duration		Module level	Other prerequisites				
1 semester		undergraduate					
Conten	ts						
Students will be provided with basics of scientific work in Geography: This includes dealing with literature, conception and writing of scientific texts as well as being able to present in an university style.							
Intende	ed learı	ning outcomes					
Students achieve basics concerning methods of scientific work. This refers to the fundamental design of scientific texts and oral presentations, application adequate working techniques as well as the necessary information competence.							
Courses (type, number of weekly contact hours, language — if other than German)							
T (2) Module taught in: German and/or English							
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)							
portfolio (approx. 15 hours total) Language of assessment: German and/or English creditable for bonus							
Allocation of places							
Additional information							
Workload							
150 h							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							