

Module catalogue – Forest Information Technology (M.Sc.) effective from winter term 2015/16

Modul	Data Analysis and Management I	
Semester	1	
Modulkoordinator	Prof. Dr. Alfred Schultz	
Status	Mandatory	
Ziel	The students are enabled to collect, analyze and store environmental data and to develop simple application programmes.	
Prüfungsform	Work report	
ECTS-Credits	6	
SWS	4	
Teilmodul	Programming I	K.01.0121.V.PL
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten		
ECTS-Credits	3	
SWS	2	
Max. Teilnehmerzahl	25	workload: 90 h / semester
Lehr- / Lernform	Lecture (12h), Practical Exercise (12h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen

Ziel	Students understand the theoretical fundamentals of computer programming and are able to create application programs of limited extent and function in a systematic way using an object-oriented programming language.	
Inhalt	<p>The course introduces the theoretical fundamentals and principal steps of developing computer application programmes. The importance and usefulness of tailor-made application programmes as effective tools to analyze and manage processes in forestry and environment is discussed.</p> <p>Students become acquainted with typical programming language elements. The .NET framework is used as concrete programming environment for developing Windows based applications. Visual Basic .NET is used as language for teaching and training purposes. Various techniques to structure programmes and organize operations are introduced. Students learn to develop programmes using several forms for input and output, and for controlling programme execution. Students learn to implement some common algorithms as procedural as well as object-oriented programmes.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	<p>Halvorson, M. (2012): Microsoft Visual Basic 2012 Step by Step. Microsoft Press.</p> <p>Knuth, D. E. (2002): The Art of Computer Programming. Vol 1-3. Addison- Wesley.</p> <p>Felleisen, M., R. B. Findler, M. Flatt & S. Krishnamurthi (2001): How to design programs. An Introduction to Computing and Programming. MIT.</p>	

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Teilmodul	Statistics I	K.01.0128.V.PL
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (15h), Practical Exercise (15h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know selected descriptive and analytical statistical methods and are enabled to accomplish environmental data analyses.	
Inhalt	<p>The knowledge of how to collect and analyze environmental data is essential for any empirical science. The course strengthens fundamentals of probability theory as well as standard methods of descriptive and analytical statistics with a focus on test theory. A thorough foundation of inferential statistics and test theory is combined with the introduction of selected parametric and nonparametric tests. Additionally the following approaches and methods are introduced and trained: contingency table analysis, sampling approaches for immobile and mobile objects, cluster and classification methods.</p> <p>Students learn to select appropriate methods for special investigation targets and will become able to accomplish analyses including the utilization of selected standard software tools having GUI. The use of tools with a programming interface is rather introduced in the component module "Statistics II". Data sources and databases from the component module "Database Management" are used.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	<p>Sokal, R.R. & F.J. Rohlf (1995/2012): Biometry. Third or fourth edition. Freeman.</p> <p>diverse Autoren (2002, 2003): Einführung in die Biometrie. Band 1 bis 4. Senat der Bundesforschungsanstalten des Bundesministeriums für Verbraucherschutz, Ernährung und Landwirtschaft.</p> <p>Norusis, M.J. (2011): IBM SPSS Statistics 19.0 – Guide to Data Analysis. Prentice Hall. [newer editions are similarly good]</p> <p>Field, A. (2005/2009): Discovering Statistics Using SPSS. Second or third edition. Sage Publications.</p> <p>Sachs, L. (2003): Angewandte Statistik. Springer.</p> <p>Dalgaard, P. (2008): Introductory Statistics with R. Springer, Berlin.</p>	

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Modul	Technological Fundamentals	
Semester	1	
Modulkoordinator	Prof. Dr. Alfred Schultz	
Status	Elective	
Ziel	The students are familiar with the fundamentals of IT systems and data collection devices.	
Prüfungsform	Technical discussion	
ECTS-Credits	6	
SWS	4	
Teilmodul	Computer Science & Technology	
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten	Prof. Dr. Alfred Schultz, Dipl.-Päd. Oskar Dietterle	
ECTS-Credits	3	
SWS	2	
Max. Teilnehmerzahl	25	workload: 90 h / semester
Lehr- / Lernform	Lecture (12h), Practical Exercise (12h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen	
Ziel	Students know topical fundamentals of computer science and technology including current computer hardware and possess practical skills using different computer environments and operating systems.
Inhalt	<p>The course introduces into the basic branches and concepts of computer science and technology such as computer architecture, software development, human-computer-interfaces and artificial intelligence. Important fundamentals to digitally represent data and information will be refreshed, extended and strengthened. Important concepts of computer communication, especially computer networks, and computer security are introduced. The expectations, challenges and risks concerning the use of computers in the modern society with a focus on forestry and environment are discussed.</p> <p>Practical exercises are related to hardware components of Personal Computers, to mobile computing devices, to accomplish basic calculations in different number systems, to calculate data storage demands and network parameters, to plan algorithms, and to encode and decode data using various encryption approaches.</p>
Weiterführende Wahlpflichtmodule	
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)
Literatur	<p>Patt, Y.N. & J. Patel (2001): Introduction to Computing Systems: From Bits and Gates to C and Beyond. McGraw-Hill.</p> <p>Brookshear, J.G. (2011): Computer Science – an overview. Addison Wesley.</p> <p>WAGmob (2013): Computer Science &#91;kindle edition&#93;. Amazon.</p> <p>Kersken, S. (2011/2013): IT-Handbuch für Fachinformatiker. Galileo Computing.</p>

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Teilmodul	Automated Data Collection	
Verantwortlich	Prof. Dr. Jan-Peter Mund	
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (15h), Practical Exercise (15h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know relevant data collection approaches and related automated data collection devices.	
Inhalt	Students are introduced to relevant concepts to collect and store observation data in ecosystems and landscapes using automated data collection devices (e.g. barcode, RFID, sensors carried by drones or small planes). They know the hardware fundamentals of selected devices and they know how collected data will be processed and stored. They are able to plan and to organize data collection campaigns. Practical training will be accomplished with available devices: e.g. handheld data collection devices with RFID sensor (e.g. Timbatec), automated weather stations and various weather data loggers within ecosystems, photo and infrared data by sensors on drones and small planes.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	Eiras, J. (2011): Data Collection & Storage (Computer Science, Technology and Applications). Nova Science Publishers various manuals of data collection devices; material provided by lecturers	

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Modul	German Language and Culture	M.01.0094
Semester	1	
Modulkoordinator		
Status	Elective	
Ziel	Students know the fundamentals of the current German society and are able to apply German language in everyday situations.	
Prüfungsform	Technical discussion 20 min	
ECTS-Credits	3	
SWS	2	
Teilmodul	German Language and Culture	K.01.0122.Ü.PL
Verantwortlich		
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	keine Begrenzung	
Lehr- / Lernform	Practical Exercise (15h), Seminar (15h), self-study 60h)	
Sprache	Deutsch	

Teilnahmevoraussetzungen		
Ziel	Students know the fundamentals of the current German society and are able to apply German language in everyday situations.	
Inhalt	The course is an offer exclusively for non-German foreign students. It introduces into German language and the fundamentals of the current German society. Everyday situations of German language are imparted and trained. It is given an insight into German social life, history and culture. Comprehension for the integration into German life and society is developed.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (25) Methodenkompetenz (25) Sozialkompetenz (25) Personalkompetenz (25)	
Literatur	Wird zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Geomatics I	M.01.0095
Semester	1	
Modulkoordinator	Prof. Dr. Jan-Peter Mund	
Status	Mandatory	
Ziel	The students know relevant concepts for the storage of spatial and non-spatial data and are enabled to use GIS for various purposes of natural resources management.	
Prüfungsform	Written Exam 180 min	
ECTS-Credits	6	
SWS	4	
Teilmodul	Database Management	K.01.0123.Pj.PL
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (15h), Practical Exercise (15h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know theoretical fundamentals of databases and are able to develop data models for spatial and non-spatial data, to implement databases and to retrieve data from databases with a special focus on spatial data.	
Inhalt	<p>The course deals with the mathematical and information technological fundamentals of databases and with the necessary practical skills to develop, implement and use databases in various software environments. Relevant elements of formal logic and the steps to create databases incl. data modelling are treated. Different database approaches are handled, although the focus is on relational databases.</p> <p>Students learn to plan databases using the concept of normalization and normal forms. SQL is introduced as language to communicate with databases. Important SQL commands are introduced and trained. The differences between stand-alone and client-server applications are demonstrated.</p> <p>Students develop a complex example database containing data from various environmental data observation campaigns using MS Access and MySQL. The database is searched from different perspectives. Resulting data sets will be analyzed in the module component "Statistics I".</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	<p>Elmasri, R. & S.B. Navathe (2003): Fundamentals of Database Systems. Addison-Wesley.</p> <p>Date, C.J. (2003): An Introduction to Data Base Systems. Addison-Wesley.</p> <p>Dubois, P. (2008/2013): MySQL. New Riders.</p>	

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	MacDonald, M. (2010): Access 2010 – The Missing Manual. O'Reilly. Rigaux, P., M. Scholl & A. Voisard (2001): Spatial Databases. With Application to GIS. Morgan Kaufmann. additional relevant literature and current scientific resources will be provided by the lecturer
Teilmodul	Geographic Information Systems I K.01.0124.Ü.PL
Verantwortlich	Prof. Dr. Jan-Peter Mund
Dozenten	
ECTS-Credits	3
SWS	2 workload: 90 h / semester
Max. Teilnehmerzahl	25
Lehr- / Lernform	Lecture (9h), Practical Exercise (15h), Seminar (6h), self-study (60h)
Sprache	English

Teilnahmevoraussetzungen	
Ziel	Students know theoretical fundamentals of Geographic Information Systems (GIS) and are enabled to apply Geospatial tools and methods for various purposes of natural resources management.
Inhalt	<p>Geospatial technologies have changed the way, surveying, environmental assessment and environmental management are implemented today and the way scientists understand the dynamics of the environment. They have also become part of our everyday life through applications such as Open Street Map, Google Maps and Google Earth or mobile navigation devices and location based services. As such, they have generated new fields of expertise and continue to inspire new applications for the forest sector. This module aims to provide the students with a sound grounding in the theory and application of geospatial technologies.</p> <p>This module provides a general introduction to the discipline GIScience&Technology. Terminology and components of GIS are introduced from various viewpoints: as technology, system and science.</p> <p>An overview of current GI technology is given followed by a simple applied spatial data collection using simple handheld GPS and dGPS equipment followed by the integration of spatial data into open source data bases. Particular GIS tools and features such as spatial reference systems emphasizing the importance of correct positioning within global or projected coordinate systems, map projection and datum, geo-referencing, data types and spatial data formats are handled in detail with simple hands-on applications.</p> <p>The second part of this module covers various kinds of spatial databases and introduces the Structured Query Language (SQL) with simple applications using a typical forest information system database.</p> <p>The role of GIS in spatial information systems and forestry is discussed followed by a discussion about aspects of integrating spatial information into forest IT and pointing out the challenges of forest GIS communities as well as the advantages of a continuously growing GI industry and its market.</p> <p>Students develop skills in collecting spatial data and using Geographical Information Systems (GIS), especially geospatial data management and analysing tools and software in order to survey, handle and analyse geospatial datasets and information. Students handle GIS software focussing on simple Open Source tools and on the ESRI ArcGIS product family. Several applied data surveying, handling analysing tasks considering about particular applications with special emphasis on forest management.</p>

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	<p>Students are expected to:</p> <ul style="list-style-type: none"> • Understand the workflow of a geospatial project • Be able to work as a team and independently on a basic geospatial project • Present logical written arguments supported with spatial evidence • Be able to critically select the geospatial technologies that can be utilised in a given or individually selected topic or application
Weiterführende Wahlpflichtmodule	
Kompetenzen	<p>Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)</p>
Literatur	<p>Burrough, P. A.; McDonnell, R. A. (1998): Principles of Geographical Information Systems, Oxford University Press</p> <p>DeMers, M. (2008): Fundamentals of Geographical Information Systems, Wiley & Sons; 4th Edition</p> <p>Longley, P.A., M.F. Goodchild, D.J. Maguire & D.W. Rhind (2010): Geographic Information Systems and Science. John Wiley & Sons.</p> <p>Robinson, A.H.; J.L. Morrison, P.C. Muehrcke, A.J. Kimerling & S.C. Guphill (1995): Elements of Cartography. Wiley & Sons.</p> <p>additional relevant literature and current scientific resources will be provided by the lecturer</p>

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Modul	Geomatics II	M.01.0095
Semester	1	
Modulkoordinator	Prof. Dr. Jan-Peter Mund	
Status	Mandatory	
Ziel	The students are enabled to use RS for various purposes of natural resources management and are familiar with the fundamentals of digital cartography.	
Prüfungsform	Project Report	
ECTS-Credits	6	
SWS	4	
Teilmodul	Remote Sensing	K.01.0123.Pj.PL
Verantwortlich	Prof. Dr. Jan-Peter Mund	
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (6h), Practical Exercise (18h), Project (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know theoretical fundamentals and are enabled to use remote sensing as one of forest and environment monitoring tools.	
Inhalt	<p>Recent advances in imaging the earth from airborne and satellite platforms, highlight the relevance that of geospatial technologies have for environmental observation, monitoring and assessment or environmental or forest management purposes. Electromagnetic radiation is transformed into information about the earth's resources to derive biophysical parameters to monitor and model natural (e.g., deforestation) and cultural (e.g., land use conversion) processes.</p> <p>This module introduces the physical principles of remote sensing (RS) and provides principles of remote sensing methods and digital image interpretation skills using optical and microwave sensors and data. Various sensor types (passive and active) are integrated into a hands-on image processing, image classification, image interpretation and GIS integration workflow. The role of RS as a of monitoring and analysing tool for forest environments and natural resources is presented and discussed with the help of various practical applications. The goal is to develop an understanding of inventorying, mapping, and monitoring earth resources through the measurement, analysis and interpretation of electromagnetic energy emitted from features of the earth surface.</p> <p>When combined, both module components of Geomatics I provide powerful practical and analytical skills that enhance applied geospatial data analysis in relevant forestry and environmental disciplines. Student projects are used to consolidate skills and develop techniques of spatial data analysis using various proprietary and open source software products. Students are challenged to evaluate their analytical spatial data skills and methodological capacities in a critical appraisal of image interpretation tools and methods.</p> <p>The physical bases of Remote Sensing (RS) (optical and microwaves) are introduced. The role of RS as method of monitoring and inventory of forest and environment is introduced, discussed and demonstrated with the help of various practical</p>	

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	<p>applications. Different branches of RS such as photographs, aerial RS and satellite RS are handled. Another focus is on image processing and on image interpretation and classification. The use of RS as source of GIS data and information is demonstrated.</p> <p>The students learn to apply relevant software products. Examples for practical exercises come mainly from forest protection.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	
Literatur	<p>Campbell, J.B. (2007): Introduction to Remote Sensing. Guilford Press, New York.</p> <p>Lillesand, T.M., R.W. Kiefer (2008): Remote Sensing and Image Interpretation. John Wiley & Sons, Inc.</p> <p>Jones, H. G. & Vaughan, R. A. 2010: Remote Sensing of Vegetation: Principles, Techniques, and Applications. Pearson Education Ltd-</p> <p>Jensen, J. R. (2013): Remote Sensing of the Environment: Pearson New International Edition: An Earth Resource Perspective.</p> <p>Aronoff, M (2005): Remote Sensing for GIS Managers, ESRI Press</p> <p>additional relevant literature and current scientific resources will be provided by the lecturer</p>	
Teilmodul	Digital Cartography	
Verantwortlich	Prof. Dr. Jan-Peter Mund	
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (9h), Practical Exercise (15h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are familiar with basics of digital cartography and are enabled to store, edit and present spatial data using standard GIS software.	
Inhalt	<p>The module introduces into the underlying principles of cartography with a special focus on digital cartography. The module brings together both the technical understanding of GIS and RS and the importance of theory to establish reasonable mapping approaches.</p> <p>The use of Geographic Information Systems and the role of RS based cartography (airborne and space) are discussed in detail. Relevant satellite platforms (Landsat, SPOT etc) and related instruments used to gather data including metric cameras, thematic mappers, radar altimeters and SAR are discussed.</p> <p>It will be outlined what currently are considered the best methods of securing and utilizing map data.</p> <p>Students will use standard GIS and RS software to process spatial data and to establish maps.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	

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Literatur	<p>Robinson, A.H.; J.L. Morrison, P.C. Muehrcke, A.J. Kimerling & S.C. Guptill (1995): Elements of Cartography. Wiley & Sons.</p> <p>Crampton, J. (2010): Mapping: A Critical Introduction to Cartography and GIS: A Critical Introduction to GIS and Cartography. John Wiley & Sons.</p> <p>additional relevant literature and current scientific resources will be provided by the lecturer</p>
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Modul	Landscape Analysis & Prediction	
Semester	1	
Modulkoordinator	Prof. Dr. Alfred Schultz	
Status	Elective	
Ziel	The students know concepts, principles and methods to analyze ecosystems and landscapes and are able to model processes in ecosystems.	
Prüfungsform	Project report	
ECTS-Credits	6	
SWS	4	
Teilmodul	Landscape Systems Analysis	
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (8h), Practical Exercise (16h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are enabled to understand concepts, principles and methods of landscape systems analysis and are trained to select and to apply different quantitative methods of landscape systems analysis for varying targets.	
Inhalt	The module introduces the students to the notion of systems analysis and to the view of landscapes as complex systems. Related concepts like composition and configuration, patterns and processes as well as scales and hierarchies are covered. The interactions of abiotic, biotic and social landscape subsystems are discussed. Various approaches to classify, structure and describe landscapes in a formal way are introduced, among them particularly GIS-oriented approaches. Special emphasize is given to the quantitative characterization of landscapes. Students learn to select and to apply appropriate quantitative methods, among them especially GIS related ones, in order to describe landscape elements and structures, and to analyze and to display landscape processes. Students learn to interpret the analytical results and to derive strategic conclusions.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	
Literatur	Lang, S. & T. Blaschke (2007): Landschaftsanalyse mit GIS. Ulmer. Farina, A. (2006): Principles and Methods in Landscape Ecology. Springer. Gergel, S. & M. Turner (2003): Learning Landscape Ecology: A Practical Guide to Concepts and Techniques. Springer. Forman, R. & M. Godron (1986): Landscape Ecology. John Wiley.	

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	<p>McGarigal, K. & B. Marks (1994). FRAGSTATS: Spatial Pattern Analysis Program for Quantifying Landscape Structure. General Technical Report PNW-GTR-351.</p> <p>additional relevant literature and current scientific resources will be provided by the lecturer</p>	
Teilmodul	Ecosystem Modelling	
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten	Prof. Dr. Alfred Schultz, Dipl.-Päd. Oskar Dietterle	
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (8h), Practical Exercise (16h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students have a principal understanding of notion and approach of ecosystem modelling and have basic practical skills to plan, develop and apply models of ecosystem related target areas.	
Inhalt	<p>The course gives an overview of ecosystem modelling and refreshes related fundamental and frequently used mathematical methods including vectors and matrices (matrix operations, determinants, eigenvalues and eigenvectors) as well as infinitesimal calculus (differential calculus, difference and differential equations, ordinary differential equations, numerical solvers). The notion of ecological compartment and the compartment approach are especially introduced considering forest insect models and models for carbon and biomass. The methods are trained and practiced with examples from population and growth modelling (Leslie matrices, growth kinetics and curves, habitat models) using the simulation software Vensim.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	
Literatur	<p>Seppelt, R. (2003): Computer-based Environmental Management. Wiley-VCH.</p> <p>Imboden, D. & S. Koch (2003): Systemanalyse. Einführung in die mathematische Modellierung natürlicher Systeme. Springer.</p> <p>Ford, A. (2009): Modelling the Environment. Island Press.</p> <p>Vensim documentation at http://vensim.com/docs/</p> <p>additional relevant literature and current scientific resources will be provided by the lecturer</p>	

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Modul	Scientific Research & Organization	
Semester	1	
Modulkoordinator	Prof. Dr. Martin Welp	
Status	Elective	
Ziel	Students are familiar with the fundamental mechanisms for the organization and management of scientific projects and are able to present scientific results in oral and written form.	
Prüfungsform	Project Presentation (50%), Project Report (50%)	
ECTS-Credits	6	
SWS	4	
Teilmodul	Project Planning & Management	
Verantwortlich	Prof. Dr. Martin Welp	
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (16h), Project (14h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are acquainted with methods of project planning and management and are able to apply these methods in practice.	
Inhalt	The module gives an overview of definitions, specifications, structure and control mechanisms of projects. The students will train to prepare a grant application, to make a feasibility study and to implement and evaluate projects. Various project management techniques including computer based techniques will be used. Students will prepare project drafts which will be discussed and evaluated in seminars.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (20) Medienkompetenz (20) Methodenkompetenz (20) Sozialkompetenz (20) Personalkompetenz (20)	
Literatur	Kerzner, H. (2003): Project Management. A System Approach to Planning, Scheduling and Controlling. John Wiley & Sons, Inc. additional relevant literature and current scientific resources will be provided by the lecturer	
Teilmodul	Scientific Writing & Presenting	
Verantwortlich	Prof. Dr. Hans-Martin Welp	
Dozenten	Prof. Dr. Hans-Martin Welp, Prof. Dr. Alfred Schultz	
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	

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Lehr- / Lernform	Lecture (8h), Practical Exercise (16h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know the fundamentals of effective scientific writing and oral presenting.	
Inhalt	<p>This course imparts the fundamentals of scientific information and communication of scientific information and especially handles the differences between oral presentations and written texts. The course is given in two segments: 1. students learn how to prepare an oral presentation including substance and structure of text components, design and creation of illustrations, use of visual media; 2. students learn to prepare an actual scientific manuscript including adjustment of text to target group, pre- and postprocessing of data/illustrations, terminology and language of text, layout, rules for submitting, dealing with reviewer comments.</p> <p>Students taking the module will complete some short writing and editing exercises and will additionally develop an oral presentation/manuscript of their individual choice.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	
Literatur	<p>Munter, M. & L. Russell (2007): Guide to Presentations. Prentice Hall.</p> <p>Forsyth, P. (2006): How to Write Reports and Proposals. Kogan Page.</p> <p>Alley, M. (1996): The Craft of Scientific Writing. Springer.</p> <p>additional relevant literature and current scientific resources will be provided by the lecturer</p>	

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Modul	Special Module I (Current Technologies and Applications)	M.01.0098
Semester	1	
Modulkoordinator	Prof. Dr. Alfred Schultz	
Status	Elective	
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Prüfungsform		
ECTS-Credits	3/6 (according to current offer)	
SWS	2/4 (according to current offer)	
Teilmodul	Special Module I (Current Technologies and Applications)	K.01.0127
Verantwortlich		
Dozenten		
ECTS-Credits	3/6 (according to current offer)	
SWS	2/4 (according to current offer)	workload: 90 h /180 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	dependent on offer	
Sprache	-	

Teilnahmevoraussetzungen		
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Inhalt	<p>This module offers a changing spectrum of topics related to current developments in the area of IT fundamentals and forest and environment related applications. The offered topics preferably deepen and extend knowledge imparted in the mandatory modules of the 1st semester (databases, Geographic Information Systems, Remote Sensing, statistics). Guest lecturers from other universities and research institutions will appear.</p> <p>Furthermore students may select Master level modules related to the core contents of the FIT programme offered by other Master programmes and accepted by the head of the study programme.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen		
Literatur	Depending on topics offered	

Module catalogue – Forest Information Technology (M.Sc.)
effective from winter term 2015/16

Modul	Data Analysis and Management II	M.01.0103
Semester	2	
Modulkoordinator	Prof. Dr. Michal Zasada	
Status	Mandatory	
Ziel	Students improve their practical skills in collecting, analyzing and presenting environmental data.	
Prüfungsform	Project report (50%), Written exam 90 min (50%)	
ECTS-Credits	6	
SWS	4	
Teilmodul	Programming II	K.01.0142.Pj.PL
Verantwortlich	Dr. Wiktor Tracz	
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (9h), Practical Exercise (15h), Project (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are able to develop application programmes of increased extend using the object oriented programming approach.	
Inhalt	The following chapters are handled: using more advanced standard controls and common dialog controls; manipulating files and directories; exception handling; enhancing user interface with using menus and toolbars; development of advanced application programmes and projects; accessing data stored in database; principles of user interface design.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	Halvorson, M. (2012): Microsoft Visual Basic 2012 Step by Step. Microsoft Press. Knuth, D. E. (2002): The Art of Computer Programming. Vol 1-3. Addison- Wesley. Felleisen, M., R. B. Findler, M. Flatt & S. Krishnamurthi (2001): How to design programs. An Introduction to Computing and Programming. MIT. additional digital references and online resources will be provided by the lecturer	
Teilmodul	Statistics II	K.01.0146.V.PL
Verantwortlich		
Dozenten		
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	

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Lehr- / Lernform	Lecture (9h), Practical Exercise (15h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	The main objective of the course is to introduce the use of the statistical programming environment for practical statistical problem solving.	
Inhalt	The following chapters are handled: data preparation and processing, statistical software, sampling, sampling and sample site determination, estimation procedures, testing statistical hypotheses, multiple and multivariate methods (non-linear regression, analyse of variance and covariance), non-linear regression, analysis of variance.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (40) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	<p>Dalgaard, P. (2008): Introductory Statistics with R. Springer, Berlin.</p> <p>Qian; S. (2009): Environmental and Ecological Statistics with R. Chapman & Hall.</p> <p>additional digital references and online resources will be provided by the lecturer</p>	

Module catalogue – Forest Information Technology (M.Sc.)
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Modul	Digital Processing of Remotely Sensed Data	M.01.0104
Semester	2	
Modulkoordinator	Dr. Krzysztof Będkowski	
Status	Elective	
Ziel	The main objective of the course is to provide students with the ability of processing remotely sensed data for forestry and environmental purposes.	
Prüfungsform	Project report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Digital Processing of Remotely Sensed Data	K.01.0133.Ü.PL
Verantwortlich	Dr. Krzysztof Będkowski	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	20	
Lehr- / Lernform	Lecture (15h), Practical Exercise (30h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	The main objective of the course is to provide students with the ability of processing remotely sensed data for forestry and environmental purposes.	
Inhalt	Introduction to digital processing of image data, image acquiring by satellite, aircraft, UAV and other remote sensing systems, image restoration, image filtering, spectral space transformation (Pan-sharpening, Vegetation indices, PCA transformation), classification (supervised and unsupervised), basics of digital photogrammetry.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50), Methodenkompetenz (40), Medienkompetenz (10)	
Literatur	<p>Books:</p> <p>Manual of Remote Sensing. American Society of Photogrammetry.</p> <p>Lillesand T.M., Kiefer R.W. (2008): Remote Sensing and Image Interpretation. John Wiley & Sons, New York.</p> <p>Groupement pour le Développement de la Télédétection Aérospatiale. GDTA: Booklet M1. Digital Image Display. Booklet B3. Color Representation.Tutorials.</p> <p>Journals:</p> <p>ISPRS Journal of Photogrammetry and Remote Sensing.</p> <p>Geoinformatics</p> <p>GIS-Geoinformationssysteme.</p> <p>http://www.geodetic.com/photogrammetry.htm</p>	

Module catalogue – Forest Information Technology (M.Sc.)
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Modul	Operational Forestry I	M.01.0105
Semester	2	
Modulkoordinator		
Status	Mandatory	
Ziel	Students are able to manage and act according to the sustainable use of forest resources with the use of new technologies and planning techniques as well as the role of forests in natural systems, climate change and forest policy.	
Prüfungsform	Written exam (40%), Work report (30%), Written exam (30%)	
ECTS-Credits	6	
SWS	6	
Teilmodul	Forest utilization	K.01.0136.V.PL
Verantwortlich	Dr. Jednoralski	
Dozenten	Dr. Jednoralski, Dr. Moskalik	
ECTS-Credits	2	
SWS	2	workload: 60 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (10h), Practical Exercise (5h), Tutorial (5h), self-study (40h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are able to recognize wood of the most important European tree species. Further they gain knowledge about wood properties, wood processing, industry and forest resources.	
Inhalt	This module contains tutorial work with samples of different wood species and practical exercises in the sawmill cycle of processing large sized timber. Further, the module offers lectures about wood properties, wood industry and forest resources.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (100)	
Literatur	COST Action E44: Wood Processing Strategies COST Action E40: Innovative utilization and products of large dimensioned timber including the whole forest-wood-chain http://www.lp.gov.pl/ in English	
Teilmodul	Close to Nature Silviculture and Nature Conservation	K.01.0140.V.PL
Verantwortlich	Dr. Kamil Bielak	
Dozenten	Prof. Dr. Bogdan Brzeziecki, Dr. Kamil Bielak	
ECTS-Credits	2	
SWS	2	workload: 60 h / semester

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Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (8h), Practical Exercise (12h), self-study (40h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	To develop an understanding of major principles and to learn major components of close-to-nature silviculture determining its role in the sustainable management of diverse forest resources and in maintaining the multifunctional character of forest stands.	
Inhalt	General introduction (characteristics of forest as a plant formation type, trees as major components of forest ecosystems; human needs and requirements on forests; forestry as an art and science of managing forests; legal foundations of forestry; the concept of Sustainable Forest Management (SFM) and its relation to Ecosystem Approach (EA); silviculture as a core segment of forestry, evolution of silviculture, major components of close-to-nature silviculture, natural forests as a source of information for close-to-nature silviculture). Forest reproduction 1 (natural and artificial regeneration as two basic modes of forest reproduction; choice of tree species (the concept of a target growing stock); composition of forest stand (species mixture); soil treatment; nursery stock (planting material) – parameters and requirements; choice of spacing; planting methods and techniques; direct seeding; natural regeneration as an alternative to artificial regeneration). Forest reproduction 2 (silvicultural regimes, silvicultural systems, the concept of regeneration cuttings and their classification: clear cuttings, shelterwood cuttings, combined cuttings, irregular shelterwood cuttings, plenter-like cuttings; general characteristics, typical applications, advantages and disadvantages, major modifications and varieties, impact of different types of regeneration cuttings on tree stand structure and forest ecosystem functioning). Forest tending (the concept of forest growth cycle, characteristics of tending operations carried out in major stand developmental phases, classification of tending operations (intermediate cuttings and other tending operations); major tasks and principles of cleanings and thinnings, the role of tending operations in maintaining and enhancing the multifunctional character of forest stands, computer simulation of thinning operations). Presentation and discussion of the representative study cases in the forest.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (10) Sozialkompetenz (10) Personalkompetenz (10)	
Literatur	Smith D.M. 1986. The practice of silviculture. Eighth edition. John Wiley & Sons. New York. Chichester. Brisbane. Toronto. Singapore. Matthews J. D. 1989. Silvicultural systems. Clarendon Press. Oxford. Persson J., Manus S. (ed.) 1990. A richer forest. The National Board of Forestry. Jönköping. Sweden. Further scientific papers and articles to be announced at start of the semester.	
Teilmodul	Forest technology and engineering	
Verantwortlich	Prof. Dr. Tadeusz Moskalik	
Dozenten	Dr. Wiesława Nowacka, Prof. Dr. Tadeusz Moskalik	
ECTS-Credits	2	

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SWS	2	workload: 60 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (8h), Practical Exercise (12h), self-study (40h)	
Sprache	English	
Teilnahmevoraussetzungen		
Ziel	Students are able to manage the sustainable use of forest resources by using new technologies, optimization and planning techniques.	
Inhalt	This course has the following contents: Organization of wood harvesting processes in premature and mature stands; methods of utilization of logging residuals; ecological aspects of timber harvesting; forest operation costs; forest road network optimization; ergonomics in harvesting operations.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (100)	
Literatur	<p>Moskalik T., 2004: Model of fully mechanized timber harvesting in sustainable Polish forestry. Wyd. SGGW, Warszawa.</p> <p>Nowacka W., Moskalik T., Paschalis Jakubowicz P., Zastocki D., 2006: Implementation and socio-economic impact of wood harvesting mechanization in Poland. Warsaw Agricultural University Press.</p> <p>Röser D., Asikainen A., Raulund-Rasmussen K., Stupak I. 2008: Sustainable use of forest biomass for energy. Springer-Verlag.</p> <p>Sessions J., Sessions J.B., 1992: Cost control in forest harvesting and road construction. FAO Forestry Paper, Rome.</p>	

Module catalogue – Forest Information Technology (M.Sc.)
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Modul	Forest Information Systems	M.01.0106
Semester	2	
Modulkoordinator	Dr. Wiktor Tracz	
Status	Elective	
Ziel	The main objective of the course is to introduce students to a wide range of topics in nowadays forest ecosystem management, information systems architecture and their use in forest ecosystems management. Students will know the utility of various information systems for forestry data analyses and will be able to apply them for solving problems related to forestry and natural environment.	
Prüfungsform	Project report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Forest Information Systems	K.01.0135.Pj.PL
Verantwortlich	Dr. Wiktor Tracz	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Practical Exercise (5h), Project (18h), Seminar (22h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	The main objective of the course is to introduce students to a wide range of topics in nowadays forest ecosystem management, information systems architecture and their use in forest ecosystems management. Students will know the utility of various information systems for forestry data analyses, and will be able to apply them for solving problems related to forestry and natural environment.	
Inhalt	Types of Information Systems (IS). Goals and specific needs of forest ecosystems management. Tasks and components of Forest Information Systems (FIS). Tools and methods of FIS' components realization. Bases of modeling.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (30) Medienkompetenz (10) Methodenkompetenz (10) Personalkompetenz (10)	
Literatur	<p>Decision Support Systems for Ecosystem Management: An Evaluation of Existing Systems. 1998. Rocky Mountain Research Station. Fort Collins.</p> <p>Mitasova H. and Mitas L. 1998. Process Modeling and Simulations, NCGIA Core Curriculum in GIScience. www.ncgia.ucsb.edu/giscc/units/u130/u130.html</p> <p>Refenes A. (ed.). 1995. Neural Networks in the Capital Markets. John Wiley and Sons. Chichester</p> <p>Robak T. and Bhaskara R. Murty. Forest Management Information</p>	

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	<p>System. www.gisdevelopment.net/technology/gis/techgi0052.htm</p> <p>Sprague Jr. R. H. and H. J. Watson, 1996: Decision support for management. Upper Saddle River, N.J.: Prentice Hall.</p> <p>Turban E., 1993: Decision Support and Expert Systems: Management Support Systems. Macmillan. New York.</p>	
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effective from winter term 2015/16

Modul	Outdoor Recreation Impact on Environment	M.01.0107
Semester	2	
Modulkoordinator	Prof. Dr. Jaroslaw Sklodowski	
Status	Elective	
Ziel	Students are able to analyse the influence of the outdoor recreation to forests and environment and of interactions between processes and external influences for practical purposes	
Prüfungsform	Work report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Outdoor Recreation Impact on Environment	
Verantwortlich	Prof. Dr. Jaroslaw Sklodowski	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (14h), Practical Exercise (22h), Seminar (9h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are able to analyse the influence of the outdoor recreation to forests and environment and of interactions between processes and external influences for practical purposes	
Inhalt		
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (40)	
Literatur	references will be published at begin of module additional digital and online resources will be provided by the lecturer	

Module catalogue – Forest Information Technology (M.Sc.)
effective from winter term 2015/16

Modul	Geomatics III	
Semester	2	
Modulkoordinator	Dr. Krzysztof Będkowski	
Status	Mandatory	
Ziel	The students are able to solve various forestry-related problems by using GIS, GPS and photogrammetry.	
Prüfungsform	Project report (50%), Written exam 90 min(50%)	
ECTS-Credits	6	
SWS	4	
Teilmodul	Forest Photogrammetry	
Verantwortlich	Dr. Krzysztof Będkowski	
Dozenten	Dr. Krzysztof Będkowski, Dr. Krzysztof Janeczko	
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (9h), Practical Exercise (9h), Project (6h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	The main objective of the course is to introduce the use of Photogrammetry and other related tools in solving of various forestry-related problems.	
Inhalt	The following chapters are handled: aerial photographs, single image and twoimage photogrammetry, stereoscopy (3D), stereopairs, simple photogrammetric Instruments and their use, digital photogrammetry, laser-scanners, photogrammetric measurement of forest stand boundaries and attributes.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (30) Medienkompetenz (10) Methodenkompetenz (10) Personalkompetenz (10)	
Literatur	<p>Books:</p> <p>Hildebrandt, G. (): Fernerkundung und Luftbildmessung.</p> <p>Wichmann 1996: Manual of Remote Sensing. American Society of Photogrammetry.</p> <p>Lillesand T.M., Kiefer R.W. 2004: Remote Sensing and Image Interpretation. John Wiley & Sons, New York.</p> <p>Journals:</p> <p>The Photogrammetric Journal of Finland.</p> <p>ISPRS Journal of Photogrammetry and Remote Sensing.</p> <p>Geoinformatics.</p> <p>GIS-Geoinformationssysteme: http://www.geodetic.com/photogrammetry.htm</p>	
Teilmodul	Geographic Information Systems III	
Verantwortlich	Dr. Krzysztof Będkowski	

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Dozenten	Dr. Krzysztof Będkowski, Dr. Michal Brach	
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (9h), Practical Exercise (15h), Seminar (6h), self-study (60h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	The main objective of the module is to introduce the use of GIS and GPS in solving of various forestry-related problems.	
Inhalt	The following chapters are handled: GPS as a data source for the GIS system, GPS systems, differential correction methods, virtual reference station and active geodetic network, GIS in pocket PC, GPS receivers, software choice for various applications, field practice.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	
Literatur	Longley, P.A., M.F. Goodchild, D.J. Maguire & D.W. Rhind (2001): Geographic Information Systems and Science. John Wiley & Sons. A.H. Robinson, J.L. Morrison, P.C. Muehrcke, A.J. Kimerling & S.C. Guptill (1995): Elements of Cartography. John Wiley & Sons.	

Module catalogue – Forest Information Technology (M.Sc.)
effective from winter term 2015/16

Modul	Sustainable Forest Management	M.01.0109
Semester	2	
Modulkoordinator	Prof. Dr. Stanislaw Miścicki	
Status	Elective	
Ziel	Students are able to use various sources of information and different techniques to prepare management plans and are able to analyze the impact of various management scenarios on forest structure.	
Prüfungsform	Technical discussion 20 min	
ECTS-Credits	4	
SWS	3	
Teilmodul	Sustainable Forest Management	K.01.0139.S.PL
Verantwortlich	Prof. Dr. Stanislaw Miścicki	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (9h), Practical Exercise (9h), Project (9h), Seminar (18h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are able to use various sources of information and different techniques to prepare management plans and are able to analyze the impact of various management scenarios on forest structure.	
Inhalt	<p>Lectures: Forest management (planning) - sources of information. Forest management units. Stands' maturity. Production objective. Forest sustainability. Regulation of the main yield.</p> <p>Project and seminar: Forest management plan (working plan) - object; forest habitat type, management stand type, forming of forest management units, forest structure (age-class-table), production objective and cutting (rotation) age, prescribed cut in the FMUs, intermediate yield by volume (calculation methods), cutting plan.</p> <p>Practical exercise: trip to the Gluchow Forest - comparing of own ideas with the real situation.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	
Literatur	<p>Gadow K., Pukkala T., Tomé M., 2000. Sustainable Forest Management. Kluwer Academic Publishers.</p> <p>Hasenauer H. (ed.), 2006. Sustainable Forest Management: Growth Models for Europe. Springer.</p> <p>Reynolds, K.M., Thomson A.J., Köhl M., Shannon M.A., Ray D., Rennolls K., 2007. Sustainable Forestry: from Monitoring and Modelling to Knowledge Management and Policy Science. CABI.</p>	

Module catalogue – Forest Information Technology (M.Sc.)
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Modul	Polish Language and Culture	
Semester	2	
Modulkoordinator		
Status	Elective	
Ziel	Students know the fundamentals of the current Polish society and are able to apply Polish language in everyday situations.	
Prüfungsform	Technical discussion 20 min	
ECTS-Credits	4	
SWS	3	
Teilmodul	Polish Culture and Language	K.01.0141.Ü.PL
Verantwortlich		
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Practical Exercise (22h), Seminar (22h), self-study (75h)	
Sprache	Deutsch	

Teilnahmevoraussetzungen		
Ziel	Students know the fundamentals of the current Polish society and are able to apply Polish language in everyday situations.	
Inhalt	The course is an offer exclusively for non-Polish foreign students. It introduces into Polish language and the fundamentals of the current Polish society. Everyday situations of Polish language are imparted and trained. It is given an insight into Polish social life, history and culture. Comprehension for the integration into Polish life and society is developed.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (25) Medienkompetenz (25) Methodenkompetenz (25) Sozialkompetenz (25)	
Literatur	Will be announced at start of the semester.	

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Modul	Spatial Analysis	M.01.0111
Semester	2	
Modulkoordinator	Dr. Wiktor Tracz	
Status	Elective	
Ziel	To introduce students to wide range of topics regarding spatial analyses; develop students' abilities to choose adequate analysis and successfully process and analyze spatial data and information about environmental objects and processes.	
Prüfungsform	Project presentation	
ECTS-Credits	4	
SWS	3	
Teilmodul	Spatial Analysis	K.01.0143.S.PL
Verantwortlich	Dr. Wiktor Tracz	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Practical Exercise (22h), Seminar (22h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are introduced to a wide range of topics regarding spatial analyses; develop students' abilities to choose adequate analysis and successfully process and analyze spatial data and information about environmental objects and processes.	
Inhalt	Overview of spatial analyses. The spatial analyze process. Types of spatial analyses. Analyze of different spatial data type. How to choose adequate analysis of spatial data. Spatial and attribute queries. Overly, neighbourhood and aggregation analyses. Interpolation and types of interpolation. Network analyses. 3D analyses and result visualization.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	
Literatur	<p>Mitchell A. 1999. The ESRI guide to GIS analysis. Geographic Patterns and Relationships. ESRI Press.</p> <p>ERDAS Field Guide. 1997. ERDAS, Inc.</p> <p>Kraak Menno-Jan, Ormeling Ferjan. 1996. Cartography: Visualization of Spatial Data. Addison Wesley Longman Limited.</p> <p>Zeiler M. 1999. Modeling our Word. ESRI Press.</p> <p>Longley P., Goodchild M., Maguire D., Rhind D. 2005. Geographic Information</p>	

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	<p>Systems and Science. Wiley, Chichester.</p> <p>Robinson A., Morrison J., others. 1995. Elements of cartography. JohnWiley and Son, NewYork.</p> <p>Using ArcGIS 10. 2012. ESRI Press</p>	
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Module catalogue – Forest Information Technology (M.Sc.)
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Modul	Fauna Monitoring Methods	
Semester	2	
Modulkoordinator	Prof. Dr. Jaroslaw Sklodowski	
Status	Elective	
Ziel	Students know theoretical fundamentals and practical approaches to collect and analyze fauna data	
Prüfungsform	Work report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Fauna Monitoring Methods	
Verantwortlich	Prof. Dr. Jaroslaw Sklodowski	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (22h), Seminar (22h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know theoretical fundamentals and practical approaches to collect and analyze fauna data	
Inhalt		
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Sozialkompetenz (10) Personalkompetenz (10)	
Literatur	to be announced at start of the semester	

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Map	Map Editing	
Semester	2	
Modulkoordinator	Dr. Michal Brach	
Status	Elective	
Ziel	Students have advanced skills in map editing. They are able to organize, process and combine spatial data in various formats and coordinate systems and to present final results following cartographic standards.	
Prüfungsform	Project presentation	
ECTS-Credits	4	
SWS	3	
Teilmodul	Map Editing	
Verantwortlich	Dr. Michal Brach	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	15	
Lehr- / Lernform	Lecture (18h), Practical Exercise (14h), Project (14h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students have advanced skills in map editing. They are able to organize, process and combine spatial data in various formats and coordinate systems and to present final results following cartographic standards.	
Inhalt		
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10)	
Literatur	to be announced at start of the semester additional digital resources will be provided by the lecturer	

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Modul	Special Module I (Current Technologies and Applications)	
Semester	2	
Modulkoordinator	Prof. Dr. Michal Zasada	
Status	Elective	
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Prüfungsform		
ECTS-Credits	4	
SWS	3	
Teilmodul	Special Module II (Current Technologies and Applications)	
Verantwortlich		
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	dependent on offer	
Sprache	-	

Teilnahmevoraussetzungen		
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Inhalt	This module offers a changing spectrum of topics related to current developments in the area of IT fundamentals and forest and environment related applications. The offered topics preferably deepen and extend knowledge imparted in the mandatory modules of the 1st semester (databases, Geographic Information Systems, Remote Sensing, statistics). Guest lecturers from other universities and research institutions will appear. Furthermore students may select Master level modules related to the core contents of the FIT programme offered by other Master programmes and accepted by the head of the study programme.	
Weiterführende Wahlpflichtmodule		
Kompetenzen		
Literatur	Depending on topics offered	

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Modul	Research Project	M.01.0115
Semester	3	
Modulkoordinator	Prof. Dr. Alfred Schultz, Prof. Dr. Michal Zasada	Alfred.Schultz@hnee.de
Status	Mandatory	
Ziel	Students are enabled to plan and accomplish a research project of moderate size and have consolidated their graduate profession empowering competences.	
Prüfungsform	Project report (75%), Term paper (25%)	
ECTS-Credits	12	
SWS	0	
Teilmodul	Practical Research Project	K.01.0148
Verantwortlich	Prof. Dr. Alfred Schultz, Prof. Dr. Michal Zasada	
Dozenten		
ECTS-Credits	12	
SWS	-	workload: 360 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Project (h)	
Sprache	-	

Teilnahmevoraussetzungen		
Ziel	Students are enabled to plan and accomplish a research project of moderate size and have consolidated their graduate profession empowering competences.	
Inhalt	The main content of the course is to develop and to deepen abilities of analytical, methodical and reporting skills in an environment close to later professional practice. Students learn to plan and accomplish a research project of moderate size. Projects are related to the application of information technologies in order to describe and / or solve problems in forestry or environment. Students accomplish the research project in own responsibility, document the working steps, discuss conclusions and prepare a final project report.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (40) Medienkompetenz (10) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	to be fixed by supervisor of research project	
Teilmodul	Scientific Internet Colloquium	
Verantwortlich	Prof. Dr. Alfred Schultz, Prof. Dr. Michal Zasada	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Seminar (45h), self-study (75h)	

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Sprache	English	
Teilnahmevoraussetzungen		
Ziel	Students are able to open new areas of IT applications, extend and manifest abilities for accomplishing scientific work incl. writing and reviewing scientific papers.	
Inhalt	<p>The goal of the course is to enable students to open new areas of IT applications in forestry and environment. The course is organized as an interactive discussion of selected scientific papers which extend ideas and concepts conveyed in the previous semesters. The papers cover a typical spectrum of forest / environment related information technologies such as Geographical Information Systems, complex databases, ecosystem modelling and simulation incl. case studies, information systems, communication structures within complex projects and to the public.</p> <p>The presented papers will be individually analyzed by the students according to inputs of the colloquium moderator. Students are requested to make additional literature search and to evaluate and to compare references. Students publish their evaluations in an online Discussion Forum. The individual contributions will then be commonly discussed and summarized. The mutual insemination and evaluation of knowledge and opinions is an integral part of the course.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (20) Medienkompetenz (30) Methodenkompetenz (30) Personalkompetenz (20)	
Literatur	Eine sich ändernde Auswahl von aktuellen wissenschaftlichen Arbeiten von IT Anwendungen in Wald- und Umweltforschung wird zu Beginn des Semesters bekannt gegeben.	

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Modul	Operational Forestry II	M.01.0116
Semester	3	
Modulkoordinator	Prof. Dr. Lech Plotkowski	
Status	Mandatory	
Ziel	The students know the political and economic framework of modern forestry and are able to apply relevant fundamentals in practice.	
Prüfungsform	Project presentation (50%), Work report (50%)	
ECTS-Credits	6	
SWS	4	
Teilmodul	Forest economics	
Verantwortlich	Prof. Dr. Lech Plotkowski	
Dozenten	Prof. Dr. Lech Plotkowski, Dr. Krzysztof Janeczko, Prof. Dr. Arkadiusz Gruchala	
ECTS-Credits	3	
SWS	2	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (29h), Practical Exercise (9h), Project (7h), self-study (45h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students will be able to economically validate various aspects of forest management	
Inhalt	approaches and methods to economically assess forest management processes	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (40) Methodenkompetenz (30) Medienkompetenz (10) Sozialkompetenz (10) Personalkompetenz (30)	
Literatur		
Teilmodul	Forest policy	K.01.0153.V.PL
Verantwortlich	Prof. Dr. Lech Plotkowski	
Dozenten	Prof. Dr. Lech Plotkowski, Dr. Krzysztof Janeczko, Prof. Dr. Piotr Paschalis-Jakubowicz	
ECTS-Credits	0	
SWS	3	workload: 90 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (22h), Practical Exercise (11h), Seminar (11h), self-study (45h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students understand the policy determinants of contemporary forestry and can apply fundamentals of modern forest policy in practice	
Inhalt	The role of forestry in modern world forest, biodiversity protection programmes,	

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	global environmental concerns, forest research and forestry institutions, global perspective on forest policy, forest certification systems.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (30) Medienkompetenz (10) Sozialkompetenz (30) Personalkompetenz (30)	
Literatur	Wird zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Forest Biometry	M.01.0117
Semester	3	
Modulkoordinator	Dr. Robert Tomusiak	
Status	Elective	
Ziel	The main objective of the course is to introduce to theoretical foundations of forest measurements, use of principles and techniques for evaluating and monitoring forest growth and yield in various methods.	
Prüfungsform	Project report (50%), Technical discussion 20 min (50%)	
ECTS-Credits	4	
SWS	3	
Teilmodul	Forest Biometry	K.01.0149.V.PL
Verantwortlich	Dr. Robert Tomusiak	
Dozenten		
ECTS-Credits	0	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (22h), Project (9h), Seminar (14h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	The main objective of the course is to introduce to theoretical foundations of forest measurements, use of principles and techniques for evaluating and monitoring forest growth and yield in various methods.	
Inhalt	This module is composed of the following topics: growth of single trees and whole stands; tree crown development; stand social structure; impact of various biotic and abiotic factors on stand structure; growth and yield, impact of thinning on stand structure; growth and yield; yield tables; introduction to growth and yield models; stem analysis; measuring trees and stands, measurement techniques for various tree and stand attributes, volume, shape, taper, and product determination for single trees, concepts and techniques to determine product/tree volume and increment of stands.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (40) Methodenkompetenz (40) Personalkompetenz (20)	
Literatur	Husch B., Beers T.W., Kershaw J.A. (2003): Forest Mensuration. Chichester: John Wiley and Sons.	

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Modul	Forest Decision Support Systems	M.01.0118
Semester	3	
Modulkoordinator	Prof. Dr. Martin Guericke	Martin.Guericke@hnee.de
Status	Elective	
Ziel	Students know the growth dynamics of trees and forest stands and are able to use various growth models and Forest Decision Support Systems to derive and support decisions.	
Prüfungsform	Project report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Forest Decision Support Systems	K.01.0150.S.PL
Verantwortlich	Prof. Dr. Martin Guericke	
Dozenten		
ECTS-Credits	0	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (22h), Seminar (22h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know the growth dynamics of trees and forest stands and are able to use various growth models and Forest Decision Support Systems to derive and support decisions.	
Inhalt	The course contains the following parts: decision process in forestry, key components of growth models and decision support systems (DSS), project identification, initiation, analysis, examples of forest DSS, use of simulation models in DSS. Students practically train the elaboration of scenarios, the analysis of computer based simulation results and the derivation of decisions using common DSS software.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (40) Medienkompetenz (20) Methodenkompetenz (20) Personalkompetenz (20)	
Literatur	Vanclay, J.K. (2001): Modelling Forest Growth and Yield : Applications to Mixed Tropical Forests. CAB International. Gregory, E. (1999): Decision Support Systems for Sustainable Development. Kluwer Academic Publisher.	

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Modul	Advanced Remote Sensing & Forest Change Detection	
Semester	3	
Modulkoordinator	Prof. Dr. Jan-Peter Mund	Jan-Peter.Mund@hnee.de
Status	Elective	
Ziel	Students are enabled to use advanced remote sensing methods to detect and analyze changes in forest ecosystems	
Prüfungsform	Project report	
ECTS-Credits	4	
SWS	3	
Teilmodul Advanced RemoteSensing & Forest Change Detection		
Verantwortlich	Prof. Dr. Jan-Peter Mund	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Seminar (45h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are enabled to use advanced remote sensing methods to detect and analyze changes in forest ecosystems	
Inhalt		
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (40) Medienkompetenz (10) Methodenkompetenz (30) Personalkompetenz (10) Sozialkompetenz (10)	
Literatur	<p>Ahern, F., J.M., Gregoire, C. Justice (2000): Forest Fire Monitoring and Mapping: A Component of Global Observation of Forest Cover. Publications of the European Commission, EUR 19588, Luxembourg.</p> <p>Glenn EP et al. (2008). Relationship Between Remotely-sensed Vegetation Indices, Canopy Attributes and Plant Physiological Processes: What Vegetation Indices Can and Cannot Tell Us about the Landscape. <i>Sensors</i>, 8, 2136-2160.</p> <p>Jensen 2006: Remote Sensing of the Environment: An Earth Resource Perspective (2nd Edition)</p> <p>Jian Guo Liu & Mason 2009: Essential Image Processing and GIS for Remote Sensing</p> <p>Jones & Vaughan 2010: Remote Sensing of Vegetation: Principles, Techniques, and Applications</p> <p>USDA – Forest service (2000): Remote Sensing in Forest Health Protection. FHTET Report No. 00-03</p> <p>Wulder, M.A., S.E. Franklin (2003): Remote Sensing of Forest Environments. Kluwer Academic Publishers.</p> <p>Weitere relevante Literatur und aktuelle wissenschaftliche Ressourcen werden in der Vorlesung präsentiert.</p>	

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Modul	Internet Programming	M.01.0122
Semester	3	
Modulkoordinator	Prof. Dr. Michal Zasada	
Status	Elective	
Ziel	Students know the potentials of the Internet as source and target of various forest and environmental information and are able to develop static and dynamic websites.	
Prüfungsform	Project report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Internet Programming	K.01.0156.Pj.PL
Verantwortlich	Prof. Dr. Michal Zasada	
Dozenten	Dr. Robert Tomusiak, Prof. Dr. Michal Zasada	
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Practical Exercise (22h), Project (9h), Seminar (14h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know the potentials of the Internet as source and target of various forest and environmental information and are able to develop static and dynamic websites.	
Inhalt	The following chapters are handled: advanced HTML tags and techniques, forms, scripts, dynamic websites, web service integration with databases, content managers.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (30) Medienkompetenz (20) Methodenkompetenz (30) Personalkompetenz (20)	
Literatur	Wird zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Tree ring analysis	M.01.0123
Semester	3	
Modulkoordinator	Dr. Robert Tomusiak	
Status	Elective	
Ziel	Students are able to conduct research based on tree-ring data and have an extended understanding of past responses of tree growth to environmental variability and prediction of forest responses to change of environment in the future.	
Prüfungsform	Project report (40%), Written exam (60%)	
ECTS-Credits	4	
SWS	3	
Teilmodul	Tree ring analysis	K.01.0157.Ü.PL
Verantwortlich	Dr. Robert Tomusiak	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Practical Exercise (22h), Seminar (22h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are able to conduct research based on tree-ring data and have an extended understanding of past responses of tree growth to environmental variability and prediction of forest responses to change of environment in the future.	
Inhalt	The following chapters are handled: process of forming of tree rings, factors effecting tree ring's width, software for control, creating and analysing tree ring chronologies, methods and applications of dendrochronology.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	Wird zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Collection and analysis of LiDAR data	M.01.0123
Semester	3	
Modulkoordinator	Prof. Dr. Jan-Peter Mund	
Status	Elective	
Ziel	Students know the physical and technological fundamentals of LiDAR data collection devices and are able to manage, process and analyze LiDAR data with relevant software tools.	
Prüfungsform	Project report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Collection and analysis of LiDAR data	
Verantwortlich	Prof. Dr. Jan-Peter Mund	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (16h), Seminar (13h), Practical exercise(16h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know the physical and technological fundamentals of LiDAR data collection devices and are able to manage, process and analyze LiDAR data.	
Inhalt		
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (50)	
Literatur	Wird zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Programming III	M.01.0124
Semester	3	
Modulkoordinator	Prof. Dr. Johannes Creutziger	Johannes.Creutziger@hnee.de
Status	Elective	
Ziel	Students are enabled to use methods of object oriented programming with ArcObjects, Visual Basic and Visual Basic for Applications, to extend ArcGIS Desktop applications and to programmatically access Database systems.	
Prüfungsform	Work report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Programming III	K.01.0158.Ü.PL
Verantwortlich	Prof. Dr. Johannes Creutziger	
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (18h), Practical Exercise (18h), Seminar (9h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are enabled to use methods of object oriented programming with Visual Basic.NET and Python. The Python module ArcPy is used for scripting of ArcGIS. Visual Basic.NET and Python are used to access databases and XML data (Extensible Markup Language) containing geographic data.	
Inhalt	The course extends and deepens the abilities to develop object oriented programmes. It includes in particular the following topics: Understanding basic Python programming, understanding the use of the ArcPy module, programming with .NET classes to access geographic data, understanding geometry objects and geoprocessing; customizing the user interface; accessing databases from Visual Basic .NET, using development tools. Students learn to develop application programs in their own responsibility.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (30) Medienkompetenz (20) Methodenkompetenz (20) Personalkompetenz (20)	
Literatur	<p>Nathan Jennings (2011): A Python Primer for ArcGIS (2011). CreateSpace, Independent Publishing Platform.</p> <p>Halvorson, Michael (2010): Microsoft Visual Basic 2010 Step by Step Your hands-on, step-by-step guide to learning Visual Basic, Microsoft-Press</p> <p>Löffelmann, Klaus & Calla Purohit, Sarika (2010): Microsoft Visual Basic 2010 - Das Entwicklerbuch. Microsoft Press, Grundlagen, Techniken, Profi-Know-how, 931 Seiten (Hardcover), Microsoft-Press.</p> <p>Thomas Theis: Einstieg in Visual Basic 2010. Galileo Computing. Online</p>	

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<p>Access to this book (Openbook):http://openbook.galileocomputing.de/einstieg_vb_2010/;</p> <p>Mark Lutz (2011), Programming Python, 1632 pages O'Reilly Media, 4th ed. (Jan. 2011). Beachte: dieses ist ein sehr umfangreiches Buch</p> <p>Mark Lutz (2011), Python Pocket Reference. (O'Reilly)</p> <p>ESRI ArcGIS Resources Website:http://resources.arcgis.com/en/help/</p> <p>Bitte nutzen Sie auch den folgenden Link zum HNEE Ilias (E-Learning-System) für aktuelle und komplette Informationen: http://ilias.hnee.de/ilias/goto.php?target=wiki_28449_resources (Pfad in HNE Ilias: Magazin » Fachbereich Holztechnik » Prof. Dr. Johannes Creutziger » Programming III)</p>	
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Modul	Non-Wood Forest Products and Services	M.01.0119
Semester	3	
Modulkoordinator	Dr. Pawel Staniszewski	
Status	Elective	
Ziel	The main objective of the course is to present forest as a source of various nonwood forest products as well as problems of estimation of non-wood forest resources, its utilization, market and law instruments.	
Prüfungsform	Written exam (50%), Work report (50%)	
ECTS-Credits	4	
SWS	3	
Teilmodul	Non-Wood Forest Products and Services	K.01.0151.V.PL
Verantwortlich		
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (22h), Practical Exercise (22h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	The main objective of the course is to present forest as a source of various nonwood forest products as well as problems of estimation of non-wood forest resources, its utilization, market and law instruments.	
Inhalt	Forest resource utilisation in sustainable forestry; resource analysis and inventory of non-wood forest products (NWFP); characteristic, harvesting, processing and quality assessment of selected NWFP; policy and law instruments related to NWFP utilisation; environmental effects; NWFP market analysis and prognosis; utilisation examples.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (70) Medienkompetenz (10) Methodenkompetenz (10) Sozialkompetenz (10)	
Literatur	Wird zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Administration and Management in Forestry	M.01.0114
Semester	3	
Modulkoordinator	Dr. Krzysztof Janeczko	
Status	Elective	
Ziel	The objective of the course is to develop knowledge about specific forest management processes and to reflect their importance for the competitive position and growth of forest businesses. Students will know how to use some analytical tools helpful in solving economic problems in forestry. The influence of non-timber forest functions on the financial results of forest businesses will also be analyzed and discussed.	
Prüfungsform	Work report	
ECTS-Credits	4	
SWS	3	
Teilmodul	Administration and Management in Forestry	
Verantwortlich		
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	15	
Lehr- / Lernform	Lecture (18h), Practical Exercise (14h), Project (14h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	The objective of the course is to develop knowledge about specific forest management processes and to reflect their importance for the competitive position and growth of forest businesses. Students will know how to use some analytical tools helpful in solving economic problems in forestry. The influence of non-timber forest functions on the financial results of forest businesses will also be analyzed and discussed.	
Inhalt	This course has following contents: Methods to calculate costs of forest processes, economically optimal technique of forest processes, applying Lagrange's method in case of limited money forest investments, forest projects budgeting and optimization with Critical Patch Method, linear programming in solving forest economic problems, dealing with economic aspects of non-timber forest functions.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (40) Medienkompetenz (10) Methodenkompetenz (10) Personalkompetenz (10)	
Literatur	Boungiorno J., Gilless J.K. 2003: Decision Methods for Forest Resource Management. Elsevier Science, London. Stover T.S. 2004: Microsoft Office Project 2003 Inside Out. Microsoft Press, Washington.	

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Modul	Special Module IIIe (Current Technologies and Applications)	M.01.0125
Semester	3	
Modulkoordinator	Prof. Dr. Alfred Schultz	Alfred.Schultz@hnee.de
Status	Elective, offered in Eberswalde	
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Prüfungsform		
ECTS-Credits	4	
SWS	3	
Teilmodul	Special Module IIIe (Current Technologies and Applications)	K.01.0159
Verantwortlich		
Dozenten		
ECTS-Credits	4	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	keine Begrenzung	
Lehr- / Lernform	Seminar (45h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Inhalt	<p>This module offers a changing spectrum of topics related to current developments in the area of IT fundamentals and forest and environment related applications. The offered topics preferably deepen and extend knowledge imparted in the mandatory modules of the 1st and the 2nd semester (databases, Geographic Information Systems, Remote Sensing, statistics, photogrammetry, programming). Guest lecturers from other universities and research institutions will appear.</p> <p>Furthermore students may select Master level modules related to the core contents of the FIT programme offered by other Master programmes and accepted by the head of the study programme.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen		
Literatur	Wird vom Dozenten zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Forest Information Technology (M.Sc.) 2015 (gültig ab WiSe 2015/16)		
Modul	Special Module IIIw (Current Technologies and Applications)	M.01.0126
Semester	3	
Modulkoordinator	Prof. Dr. Michal Zasada	
Status	Elective, offered in Warsaw	
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Prüfungsform		
ECTS-Credits	4	
SWS	3	
Teilmodul	Special Module IIIw (Current Technologies and Applications)	K.01.0160
Verantwortlich		
Dozenten		
ECTS-Credits	0	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	keine Begrenzung	
Lehr- / Lernform	Seminar (45h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Inhalt	This module offers a changing spectrum of topics related to current developments in the area of IT fundamentals and forest and environment related applications. The offered topics preferably deepen and extend knowledge imparted in the mandatory modules of the 1st and the 2nd semester (databases, Geographic Information Systems, Remote Sensing, statistics, photogrammetry, programming). Guest lecturers from other universities and research institutions will appear. Furthermore students may select Master level modules related to the core contents of the FIT programme offered by other Master programmes and accepted by the head of the study programme.	
Weiterführende Wahlpflichtmodule		
Kompetenzen		
Literatur	Wird vom Dozenten zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Environmental Monitoring	
Semester	4	
Modulkoordinator	Dr. Wiktor Tracz	
Status	Elective	
Ziel	Students are able to select main fields and apply possible practical application of remote sensing techniques with a landscape ecological approach.	
Prüfungsform	Technical discussion 20 min	
ECTS-Credits	6	
SWS	4	
Teilmodul	Environmental Monitoring	
Verantwortlich	Dr. Wiktor Tracz	
Dozenten		
ECTS-Credits	6	
SWS	4	workload: 180 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (30h), Seminar (30h), self-study (120h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are able to select main fields and apply possible practical application of remote sensing techniques with a landscape ecological approach.	
Inhalt	Introduction to contemporary remote sensing (RS) technology; principles of RS image interpretation for rural areas monitoring with ecological landscape approach, and the selection of main fields of possible practical application (IACS, precision agriculture, crop condition evaluation, land use/land cover change, disaster management on the rural areas).	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	<p>Ahern, F., J.M. Gregoire, C. Justice (2000): Forest Fire Monitoring and Mapping: a Component of Global Observation of Forest Cover. Publications of the European Commission, EUR 19588, Luxembourg.</p> <p>Council Regulation 1968&#47;2005 EAFARD- cross-compliance, definition and goals</p> <p>Council Regulation 78&#47;2008 (remote-sensing applications)</p> <p>GAEC control with remote sensing</p> <p>World and pan-european programs demanding and delivering remote sensing- based information: Millennium Ecosystem Assessment (MA), Global Forest Resources Assessment (FRA 2010), Natura2000, Infrastructure for Spatial Information in the European Community (INSPIRE), Global Monitoring for Environment and Security' (GMES), Integrated Administration and Control System (IACS) for the Common Agricultural Policy</p>	

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Forest Information Technology (M.Sc.) 2015 (gültig ab WiSe 2015/16)		
Modul	Forest Inventory and Modelling	M.01.0130
Semester	4	
Modulkoordinator	Prof. Dr. Michal Zasada	
Status	Elective	
Ziel	Students are able to apply deepened knowledge of the statistical fundamentals of forest inventory for planning and evaluating inventories.	
Prüfungsform	Written exam (50%), Project report (50%)	
ECTS-Credits	6	
SWS	4	
Teilmodul	Forest Inventory and Modelling	K.01.0164.V.PL
Verantwortlich		
Dozenten		
ECTS-Credits	6	
SWS	4	workload: 180 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (24h), Project (18h), Seminar (18h), self-study (120h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students are able to apply deepened knowledge of the statistical fundamentals of forest inventory for planning and evaluating inventories.	
Inhalt	Representative method; sampling frame construction; sample design; estimation methods; sampling error; examples of forest inventory using various designs.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	Shiver, B.D. & B.E. Borders (1996): Sampling Techniques for Forest Resource Inventory. John Wiley & Sons. Iles K. (2003): A sampler of Inventory Topics. Kim Iles & Associates. Additional materials provided by the lecturer	

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Modul	Web Databases	M.01.0131
Semester		
Modulkoordinator	Prof. Dr. Alfred Schultz	Alfred.Schultz@hnee.de
Status	Elective	
Ziel	Students know the theoretical fundamentals and possess the practical skills to design and to implement Internet based databases.	
Prüfungsform	Project report	
ECTS-Credits	6	
SWS	4	
Teilmodul	Web Databases	K.01.0165.V.PL
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten		
ECTS-Credits	0	
SWS	4	workload: 180 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (24h), Practical Exercise (24h), Seminar (12h), self-study (120h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know the theoretical fundamentals and possess the practical skills to design and to implement Internet based databases.	
Inhalt	The course introduces advanced chapters of database management systems and treats the design and implementation of databases for use in the Internet. Database design skills and the knowledge of SQL language elements are strengthened and extended. The PHP programming language (basics, variables, control structures) is introduced. The notion of client-server-databases is imparted using LAMP and WAMP environments. Practical exercises for designing databases will be accomplished using MySQL. Various techniques to create and manipulate MySQL tables through PHP and to perform SQL queries to obtain data from MySQL databases are introduced and trained. Course participants develop jointly an application project.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	<p>Elmasri, R. & S. B. Navathe (2004): Fundamentals of Database Systems. Addison-Wesley.</p> <p>Date, C.J. (2003): An Introduction to Data Base Systems. Addison-Wesley.</p> <p>Dubois, P. (2012): MySQL. New Riders.</p> <p>Welling, L. & L. Thomson (2008&#47;2013): PHP and MySQL Web Development. New Riders Publishing SAMS. (2008 Edition ist im Kursordner als kostenloses e-book erhältlich)</p>	

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Modul	Special Module IVe (Current Technologies and Applications)	M.01.0132
Semester	4	
Modulkoordinator	Prof. Dr. Alfred Schultz	Alfred.Schultz@hnee.de
Status	Elective	
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Prüfungsform		
ECTS-Credits	6	
SWS	4	
Teilmodul	Special Module IVe (Current Technologies and Applications)	K.01.0166
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten		
ECTS-Credits	6	
SWS	4	workload: 180 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform		
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Inhalt	This module offers a changing spectrum of topics related to current developments in the area of IT fundamentals and forest and environment related applications. The offered topics preferably deepen and extend knowledge imparted in the mandatory modules of the 1st and the 2nd semester (databases, Geographic Information Systems, Remote Sensing, statistics, photogrammetry, programming). Guest lecturers from other universities and research institutions will appear.	
Weiterführende Wahlpflichtmodule		
Kompetenzen		
Literatur	Wird zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Special Module IVw (Current Technologies and Applications)	M.01.0133
Semester	4	
Modulkoordinator	Prof. Dr. Michal Zasada	
Status	Elective	
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Prüfungsform		
ECTS-Credits	6	
SWS	4	
Teilmodul	Special Module IVw (Current Technologies and Applications)	K.01.0167
Verantwortlich		
Dozenten		
ECTS-Credits	6	
SWS	4	workload: 180 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Seminar (60h), self-study (120h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students become acquainted with current developments of IT and their applications in forestry and environment related areas.	
Inhalt	This module offers a changing spectrum of topics related to current developments in the area of IT fundamentals and forest and environment related applications. The offered topics preferably deepen and extend knowledge imparted in the mandatory modules of the 1st and the 2nd semester (databases, Geographic Information Systems, Remote Sensing, statistics, photogrammetry, programming). Guest lecturers from other universities and research institutions will appear.	
Weiterführende Wahlpflichtmodule		
Kompetenzen		
Literatur	Wird zu Beginn der Lehrveranstaltung bekannt gegeben.	

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Modul	Student Research Colloquium	M.01.0134
Semester		
Modulkoordinator	Prof. Dr. Alfred Schultz	Alfred.Schultz@hnee.de
Status	Mandatory	
Ziel	Students extend and strengthen abilities to carry out scientific work and develop and manifest skills to evaluate and communicate results of this work.	
Prüfungsform	Project presentation	
ECTS-Credits	4	
SWS	3	
Teilmodul	Student Research Colloquium	K.01.0168
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten		
ECTS-Credits	0	
SWS	3	workload: 120 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Seminar (45h), self-study (75h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students extend and strengthen abilities to carry out scientific work and develop and manifest skills to evaluate and communicate results of this work.	
Inhalt	<p>Students present the results of a scientific project related to current areas of IT application in forestry and environment. While doing so, selected, especially IT-related topics of the curriculum are independently deepened concerning content and methods.</p> <p>Students demonstrate their topical knowledge about the selected research problem, but also show their abilities to present it in a convincing manner. Students are requested to give reasons for and to defend positions and to deal with feedback and critics. Conclusions concerning further working steps and expectations should be derived. The research results are summarized in a ready-to-publish form for the homepage of the study programme and presented within the frame of a public colloquium. The presentation should show that details and interrelationships are elaborated and understood on a wide base of sources.</p>	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (20) Medienkompetenz (20) Methodenkompetenz (20) Sozialkompetenz (20) Personalkompetenz (20)	
Literatur		

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Modul	Environmental Data Analysis	M.01.0135
Semester		
Modulkoordinator	Prof. Dr. Alfred Schultz	Alfred.Schultz@hnee.de
Status	Elective	
Ziel	Students know theoretical fundamentals of analyzing non-spatial and spatial environmental data and are able to pre-process, compile and analyze large structured and unstructured environmental data sets for different targets. Students are able to apply related software for data analysis and visualization.	
Prüfungsform	Project report	
ECTS-Credits	6	
SWS	4	
Teilmodul	Environmental Data Analysis	K.01.0169.V.PL
Verantwortlich	Prof. Dr. Alfred Schultz	
Dozenten		
ECTS-Credits	6	
SWS	4	workload: 180 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (24h), Practical Exercise (24h), Seminar (12h), self-study (120h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know theoretical fundamentals of analyzing non-spatial and spatial environmental data and are able to pre-process, compile and analyze large structured and unstructured environmental data sets for different targets. Students are able to apply related software for data analysis and visualization.	
Inhalt	The module introduces essential concepts and the differences of non-spatial and spatial environmental data analysis – including statistical and non-statistical methods. One focus is on the concept of data mining and knowledge discovery in databases. Here an overview of principal mining techniques and practical skills to select and apply methods such as 1. clustering, 2. association, 3. classification and 4. numeric prediction are imparted. Demonstration examples come from applications in environmental research and practice. The second focus is on analysis of spatial data. Here the fundamentals of spatial interpolation including theoretical concepts and practical methods for the visualization of spatial environmental data are imparted. Special emphasis is given to the geostatistical approach (variogram, variogram modelling, spatial prediction, kriging and cokriging). Students learn to select and to apply appropriate methods for data analysis and will become able to accomplish analyses including the utilization of common software tools.	
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	Witten, I. A. & E. Frank (2005): Data Mining. Elsevier. Han, J. & M. Kamber (2000): Data Mining: Concepts and Techniques. Morgan	

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Kaufmann Publishers.

Tukey, J. W (1978): Exploratory Data Analysis. Addison-Wesley.

Isaaks, E.H. & R.H. Srivastava (1992): Introduction to Applied Geostatistics. Oxford University Press.

Webster, R. & M. A. Oliver (2007): Geostatistics for Environmental Scientists. John Wiley & Sons.

Johnston, K., J. Ver Hoef, K. Krivoruchenko & N. Lucas (2012): Using ArcGIS Geostatistical Analyst. ESRI.

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Modul	Applied remote sensing innovations	
Semester	4	
Modulkoordinator	Prof. Dr. Jan-Peter Mund	
Status	Elective	
Ziel	Students know about current remote sensing innovations and are enabled to use remote sensing and geographic information systems for various purposes in different applications especially related to phenomena observed on global scale	
Prüfungsform	Project report	
ECTS-Credits	6	
SWS	4	
Teilmodul	Applied remote sensing innovations	
Verantwortlich		
Dozenten		
ECTS-Credits	6	
SWS	4	workload: 180 h / semester
Max. Teilnehmerzahl	25	
Lehr- / Lernform	Lecture (30h), Seminar (30h), self-study (120h)	
Sprache	English	

Teilnahmevoraussetzungen		
Ziel	Students know about current remote sensing innovations and are enabled to use remote sensing and geographic information systems for various purposes in different applications especially related to phenomena observed on global scale	
Inhalt		
Weiterführende Wahlpflichtmodule		
Kompetenzen	Fachkompetenz (50) Methodenkompetenz (40) Personalkompetenz (10)	
Literatur	<p>ASCHBACHER; J & PILAR MILAGRO-PÉREZ; M. (2012): The European Earth monitoring (GMES) programme: Status and perspectives. In: Remote Sensing of Environment 120 (2012) 3–8.</p> <p>ELSHARKAWY, A., ET AL. (2012). Improvement in the Detection of Land Cover Classes Using the Worldview-2 Imagery ASPRSSacramento, CA.</p> <p>Donlon, C. et al (2012): The Global Monitoring for Environment and Security (GMES) Sentinel-3 mission. In: Remote Sensing of Environment 120 (2012) 37– 57.</p> <p>Jensen 2006: Remote Sensing of the Environment: An Earth Resource Perspective (2nd Edition)</p> <p>Jones & Vaughan 2010: Remote Sensing of Vegetation: Principles, Techniques, and Applications</p> <p>Wulder, M.A., S.E. Franklin (2003): Remote Sensing of Forest Environments. Kluwer Academic Publishers.</p> <p>Weitere relevante Literatur und aktuelle wissenschaftliche Ressourcen werden in der Vorlesung präsentiert.</p>	