



SZKOŁA GŁÓWNA
GOSPODARSTWA
WIEJSKIEGO

Study programme

Forest Information Technology

Faculty:	Faculty of Forestry
Level of study:	second cycle (post bachelor's degree)
Education profile:	General academic
Form of study:	full-time studies
Academic year:	2024/25

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Basic information

Faculty name:	Faculty of Forestry
Major name:	Forest Information Technology
Level of study:	second cycle (post bachelor's degree)
Profile of study:	General academic
Form of study:	full-time studies
Duration of studies (number of semesters):	4
Number of ECTS required to complete the studies:	120
The number of ECTS points a student obtains during classes conducted with the direct participation of academic teachers or other persons conducting classes:	61
Professional title awarded to graduates:	magister
ISCED code:	0821
Language of study:	english

Assigning the major to the fields and disciplines to which the learning outcomes relate

Forest science	90%
Environmental engineering, mining and energy	10%

Major characteristics

Major characteristics

The Forest Information Technology is a four-semester Master's study programme implemented in cooperation between the Eberswalde University for Sustainable Development, Faculty of Forest and Environment, and the Warsaw University of Life Sciences - SGGW, Faculty of Forestry.

Digital, smart, and innovative technologies have found their way into forestry and natural resource management, and are there to stay. Therefore, the international Master's study programme Forest Information Technology focuses on fundamental and applied knowledge of environmental information technologies and Green Information Technologies (Green IT) applications in the global forestry context including, among others natural resource management. With its interdisciplinary approach, the study programme offers a unique and innovative intercultural, international learning environment.

As a student, you learn to solve complex problems based on a deepened and extended understanding of data structures, algorithms as well as processes and relationships within ecosystems, based on a broad spectrum of scientific methods and tools for the collection, analysis, storage, visualization, and communication of environmental and forestry data. In the scope of the Forest Information Technology programme, you acquire innovative scientific methods and tools required for collecting, processing, analyzing, managing, and communicating environmental data with an emphasis on sustainable management of forests and other ecosystems.

Graduates are experts in the application of modern information technologies in the forest and environmental sector and can solve problems in silvicultural practice as well as spatial information and data management. The certificates of degree are issued by the two enrolling partner universities. Both diplomas enable entering various European and international job markets with a focus on digital technologies or sustainable natural resource management and empirical ecological research using: spatial and digital data, forest and environmental management, ecological consulting, and others.

Learning objectives

The International Master's Programme in Forest Information Technology teaches students to solve complex problems based on:

- an expanded understanding of structures, processes, and interrelationships in natural and managed forest ecosystems, natural and agricultural landscapes, as well as in the political and social environment of climate-sensitive environmental management and sustainable forest management and,
- a broad spectrum of scientific methods and IT tools for the collection and analysis of empirical data and the collection, analysis, storage, visualization, and communication of environmental data. Students are in particular enabled to creatively apply software products widely used in the forest and environmental sector, to use and adapt them appropriately, to open up new areas, and to independently plan and develop new application software.

Education concept

The concept of education implemented at the Forest Information Technology Master's Programme is related to the strategy of the Warsaw University of Life Sciences - SGGW and the quality policy of student education conducted at the Warsaw University of Life Sciences - SGGW. According to the adopted strategy, five major areas are distinguished:

- improvement of scientific research,
- improvement of education,
- strengthening international cooperation,
- development of knowledge transfer to the economy,
- optimization of administration work, financial development and modernization of infrastructure, implementation of the Sustainability Development Goals.

They are determinants in terms of the developed concept of education expressed in the program of the Forest Information Technology studies, including knowledge in the field of agricultural sciences and the discipline of forest sciences (according to the Polish classification of disciplines). The general academic profile of the Programme, including classes aimed at acquiring knowledge, skills, and social competencies, is a part of the scientific research activities conducted at the Warsaw University of Life Sciences - SGGW.

The concept of education in the field of Forest Information Technology enables second-cycle students to learn and

understand, among others:

- the main areas of application of IT in the forest and environmental sector as well as future trends and challenges,
- the different scientific approaches and methodological concepts of various disciplines in the environmental field,
- the relevant concepts and methods for obtaining, analysing, storage, visualisation, and dissemination of environmental data,
- the theoretical foundations of database and information technology as well as geo-informatics and applied remote sensing,
- the functioning of forest ecosystems, landscape, and biosphere,
- the basics and procedures for computer- and model-supported situation analysis, decision support systems and impact assessment in forest ecosystems and the environmental sector.

The concept of education in the field of Forest Information Technology enables students of the second-cycle studies to acquire skills in the field of:

- plan, conduct, analyse, and interpret scientific research in the field of forest sciences,
- derive IT-related tasks, develop, and implement solution strategies,
- carry out empirical data analyses, use different databases and geographical information,
- analysis of the effectiveness of economic processes in forestry, a preliminary economic assessment of activities carried out in the field of forestry and the natural environment, and the valuation of forest functions,
- recognize threats to ecosystems, create methods for their detection, monitoring, and research,
- think and act in an entrepreneurial way and make decisions based on rational premises.

The duration of the Forest Information Technology Master's Programme is 4 semesters. Classes during the first semester are carried out at the Eberswalde University for Sustainable Development, Faculty of Forest and Environment (Germany). The second semester takes place in the Warsaw University of Life Sciences, Faculty of Forestry (Poland). In the case of the third and fourth semesters, students choose the university where they conduct their classes and an optional external institution to perform the research project.

During the first year of studies, the conducted modules concerned the application of environmental information technologies in forestry and environment subject areas. In the third semester, the main emphasis is placed on the conduct of a research project. Within this activity, students are required to plan and accomplish a particular research activity of moderate size and confirm their senior level of graduate academic maturity concerning their thematic focus. In addition, the research project can be carried out in an external institution (e.g. Forest Research Institute, Center of Wood Technology or S. Sakowicz Inland Fisheries Institute) and may be an introduction to the master's thesis, the preparation of which is planned for the fourth semester.

During all four semesters, students can choose elective modules (semester 1-3, 12 ECTS credits, semester 4 - 6 ECTS credits). The freedom to choose elective modules from the offered set allows students to independently shape their professional development path within the field of study but also provides the opportunity to expand knowledge in areas not directly related to the field of study. In subsequent semesters, the selection of elective modules takes place in the preceding semester. The pool of subjects to choose from in each semester is open and allows students to propose new issues raised during classes for approval by the dean.

Since the Forest Information Technology Master's Programme is implemented in cooperation between the Eberswalde University for Sustainable Development, Faculty of Forest and Environment, and the Warsaw University of Life Sciences - SGGW, Faculty of Forestry, the certificates of degree are issued exclusively by the two enrolling partner universities. Both diplomas enable entering various European and international job markets with a focus on digital technologies or sustainable natural resource management and empirical ecological research using digital data, forest and environmental management or ecological consultancy. In addition, diplomas issued by the two universities are an accepted prerequisite for continuing education at the PhD level, e.g. through studies under the PhD school of another mode leading to the obtaining of the PhD degree. This allows him to independently conduct lifelong learning, especially in the context of changes resulting from the needs of the labour market and changing environment.

Description of work placement (if provided for in the study programme)

The Forest Information Technology study program does not provide for apprenticeships

Graduate profile

Graduates can use a wide range of methods and tools to collect, analyze, store, visualize, and communicate data about the forest and the natural environment. Graduate is particularly qualified to create, creatively use and adapt computer software for the above purposes, and to search for new fields of its application.

This Master's programme offers a large variety of fundamental and applied IT topics from three sectors: Forest, Information, and Technology. Graduates of Forest Information Technology are ready to compete in a diversified but also highly specialized job market of environmental data analytics, natural resource management, and applied research in the forest and environmental sector in Europe or beyond.

The graduate is prepared for a wide range of activities in the field of using information technologies in the practice of forestry and in environmental science. The graduate can solve complex problems based on a deepened and extended understanding of structures, processes, and relationships within ecosystems, landscapes, forestry, and the timber industry.

A graduate of the Forest Information Technology Master's Programme is prepared to implement the idea of sustainable forest management, also in the context of regional development and ensuring the sustainability of forest ecosystems. In addition the graduate can formulate independent judgments and properly understands phenomena occurring in the environment.

Forest Information Technology graduates hold diplomas from two European higher education institutions: the Eberswalde University for Sustainable Development and the Warsaw University of Life Sciences - SGGW. Both certificates enable entering various European and international job markets with a focus on digital technologies or sustainable natural resource management. Master certificates issued by the two universities are an accepted prerequisite for continuing your studies as a PhD student or entering any other doctoral degree programme.

Learning outcomes

Knowledge

Code	Content	PRK
FIT_K2_W01	The graduate knows and understands the relevant concepts and methods for obtaining, analysing, storage, visualisation and dissemination of environmental data	P7S_WG
FIT_K2_W02	The graduate knows and understands the theoretical foundations of database and information technology as well as geo-informatics and applied remote sensing	P7S_WG
FIT_K2_W03	The graduate knows and understands the technical fundamentals and the current development trends of modern information technologies (IT). They know basic terms and concepts of current IT applications and current IT technology (hardware and software)	P7S_WG
FIT_K2_W04	The graduate knows and understands the main areas of application of IT in the forest and environmental sector as well as future trends and challenges	P7S_WK
FIT_K2_W05	The graduate knows and understands the basics and procedures for computer- and model-supported situation analysis and impact assessment in forest ecosystems and in the environmental sector	P7S_WK
FIT_K2_W06	The graduate knows and understands the functioning of forest ecosystems, landscape and biosphere	P7S_WG
FIT_K2_W07	The graduate knows and understands methods, techniques and technologies used in the field of forest environment management, including different silvicultural systems	P7S_WK
FIT_K2_W08	The graduate knows and understands the utilisation forms of forest ecosystems and technological processes	P7S_WG
FIT_K2_W09	The graduate knows and understands the principles of managing financial and material resources at various levels	P7S_WK
FIT_K2_W10	The graduate knows and understands the different scientific approaches and methodological concepts of various disciplines in the environmental field	P7S_WK
FIT_K2_W11	The graduate knows and understands key concepts and principles in the field of industrial property protection and copyright, important for forestry and natural environment	P7S_WK

Skills

Code	Content	PRK
FIT_K2_U01	The graduate can carry out empirical data analyses, use databases and Geographical Information Systems	P7S_UW
FIT_K2_U02	The graduate can apply special methods of forestry and environmental data collection and analysis	P7S_UW
FIT_K2_U03	The graduate can derive IT-related tasks, develop, and implement solution strategies	P7S_UW
FIT_K2_U04	The graduate can plan, conduct, analyze and interpret scientific research in the field of forest sciences	P7S_UW

Code	Content	PRK
FIT_K2_U05	The graduate can make an analysis of the effectiveness of economic processes in forestry, a preliminary economic assessment of activities carried out in the field of forestry and the natural environment and the valuation of forest functions	P7S_UW
FIT_K2_U06	The graduate can recognize threats to ecosystems, create methods for their detection, monitoring and research	P7S_UK
FIT_K2_U07	The graduate can prepare presentations and conduct a debate using professional vocabulary in the field of forestry and the natural environment	P7S_UK
FIT_K2_U08	The graduate can manage teamwork at various levels of management in in the forest and environmental sector	P7S_UO
FIT_K2_U09	The graduate can think and act in an entrepreneurial way and to make decisions based on rational premises	P7S_UO
FIT_K2_U10	The graduate can independently plan and implement their own lifelong learning and direct others in this area	P7S_UU

Social competence

Code	Content	PRK
FIT_K2_K01	The graduate is ready to setting priorities for the implementation of a task defined by oneself or others for the purpose of effective management, critical analysis of knowledge resources, and searching for its sources among experts	P7S_KK
FIT_K2_K02	The graduate is ready to fulfil social obligations, to inspire and organise activities for the benefit of the natural and social environment.	P7S_KO
FIT_K2_K03	The graduate is ready to fulfil the role of the forestry profession in shaping and developing local communities.	P7S_KO
FIT_K2_K04	The graduate is ready to perform professional roles responsibly, taking into account the development of the achievements of the forestry profession, maintaining the ethos of the profession, and observing and developing the principles of professional ethics.	P7S_KR
FIT_K2_K05	The graduate is ready to coopere and cooperation in the team, assuming various roles in it, including managerial functions.	P7S_KR

Study plan

Semester 1

In semester 1, students complete library training and a health and safety course on a platform available at <https://szkolenia.sggw.pl>

Subject	Number of hours	ECTS points	Form of verification	
OHS training	OHS training: 4	0	Pass	O
Principles of forest data structures	Lecture: 15 Laboratory exercises: 15	3	Pass	O
Principles of GIS and Remote Sensing	Lecture: 15 Laboratory exercises: 15	3	Pass	O
Applied Programming in Forestry	Lecture: 24 Laboratory exercises: 36	6	Pass	O
Forestry data structures and spatial data models	Lecture: 12 Laboratory exercises: 18	3	Exam	O
Environmental spatial data analysis	Lecture: 12 Laboratory exercises: 18	3	Exam	O
Faculties I	Lecture: 120	12	Pass	G
The student chooses subjects for a total number of ECTS 12				
Faculty list of elective courses	Lecture: 120	12	Pass	F
Sum	304	30		

Semester 2

Subject	Number of hours	ECTS points	Form of verification	
Close to Nature Silviculture & Nature Conservation	Lecture: 12 Laboratory exercises: 28	2	Pass	O
Forest engineering and utilization	Lecture: 10 Laboratory exercises: 20	2	Pass	O
Forest policy and economics	Lecture: 15 Laboratory exercises: 25	2	Pass	O
Applied GIS programming	Lecture: 12 Laboratory exercises: 18	2	Pass	O
Environmental data analysis and modeling	Lecture: 9 Laboratory exercises: 21	2	Pass	O

Subject	Number of hours	ECTS points	Form of verification	
GIS in forest practice	Lecture: 12 Laboratory exercises: 18	2	Pass	O
Forest Photogrammetry	Lecture: 6 Laboratory exercises: 24	2	Pass	O
Digital Processing of Remotely Sensed Data	Lecture: 15 Laboratory exercises: 15	2	Pass	O
Forest inventory and modelling	Lecture: 6 Laboratory exercises: 24	2	Pass	O
Faculties II	Lecture: 120	12	Pass	G
The student chooses subjects for a total number of ECTS 12 (including a mandatory subject in the humanities and social sciences)				
Faculty list of elective courses	Lecture: 120	12	Pass	F
Sum	410	30		

Semester 3

Subject	Number of hours	ECTS points	Form of verification	
Scientific Internet Colloquium	Laboratory exercises: 30	3	Pass	O
Scientific or technical research project	Laboratory exercises: 90	15	Pass	G
Scientific or technical research project	Laboratory exercises: 90	15	Pass	F
Faculties III	Lecture: 120	12	Pass	G
The student chooses subjects for a total number of ECTS 12				
Faculty list of elective courses	Lecture: 120	12	Pass	F
Sum	240	30		

Semester 4

Subject	Number of hours	ECTS points	Form of verification	
Research colloquium	Laboratory exercises: 30	4	Pass	O
Faculties IV	Lecture: 60	6	Pass	G
The student chooses subjects for a total number of ECTS 6				
Faculty list of elective courses	Lecture: 60	6	Pass	F
Master thesis	Diploma thesis: 0	20	Exam	G

Subject	Number of hours	ECTS points	Form of verification	
Master thesis	Diploma thesis: 0	20	Exam	F
Sum	90	30		

O - Obligatory subjects
G - Mandatory group
F - Elective subjects

Subject name:		Principles of forest data structures	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	forest data structures and their spatial and digital representation	FIT_K2_W03
	U1	utilize IT based methods and techniques of relevance for forest science analysis and management	FIT_K2_U02, FIT_K2_U03
	K1	critical evaluation of knowledge and received content	FIT_K2_K05
Course content ensuring the achievement of learning outcomes:		Students recognize fundamental knowledge about forest data structures and their spatial and digital representation. They understand IT based methods and techniques of relevance for forest science analysis and management.	
Examination methods:		Pass, Project	

Subject name:		Principles of GIS and Remote Sensing	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	possibilities of use of geospatial data and technology in ecological and sustainable forest management	FIT_K2_W04
	U1	understand principal methods of geospatial spatial data	FIT_K2_U04
	U2	analyze and interpret geospatial data collected primarily in forest ecosystems	FIT_K2_U02
	K1	fulfill social obligations, inspire and organize activities for the social environment	FIT_K2_K02, FIT_K2_K04
Course content ensuring the achievement of learning outcomes:		Students get to know introduction to the use of geospatial data and technology in ecological and sustainable forest management and applied forest technology and more broadly in environmental sciences. They understand principal methods of geospatial spatial data and technology in forest ecosystems.	
Examination methods:		Pass, Project	

Subject name:		Applied Programming in Forestry	ECTS: 6
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	capabilities of identification and selection of data types and structures according to a given problem.	FIT_K2_W05
	W2	capabilities of use computer programming techniques to analyze complex datasets from practical applications in environmental science and forestry	FIT_K2_W07
Skills: (In terms of skills, the graduate can)	U1	deploy algorithms conceptually and implement them using a programming language	FIT_K2_U02
Social competences: (Within the scope of competence, the graduate is ready to)	K1	fulfill social obligations, inspire and organize activities for the social environment	FIT_K2_K05
Course content ensuring the achievement of learning outcomes:		Students identify and select data types and structures according to a given problem. The students deploy algorithms conceptually and implement them using a programming language. The students use computer programming techniques to analyze complex datasets from practical applications in environmental science and forestry.	
Examination methods:		Pass, Report	

Subject name:		Forestry data structures and spatial data models	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the theoretical fundamentals of data concepts	FIT_K2_W02, FIT_K2_W05
	U1	plan and implement databases for spatial data processing	FIT_K2_U01, FIT_K2_U03
	K1	initialize activities for the public interest	FIT_K2_K02, FIT_K2_K03
Course content ensuring the achievement of learning outcomes:		Students know the theoretical fundamentals of data concepts and are able to plan and to implement databases for spatial data processing. They define and describe the important data structures and data types involved in the creation of spatial data models and identify the processing techniques required by different types of data. They are able to perform conversions and information retrieval from complex data sources.	
Examination methods:		Exam, Report	

Subject name:		Environmental spatial data analysis	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the basic statistical measures and their use in the description of environmental spatial data	FIT_K2_W01
	W2	elements of statistical inference	FIT_K2_W02
Skills: (In terms of skills, the graduate can)	U1	choose the appropriate method for the problem being solved and perform analyzes with statistical software	FIT_K2_U05
	U2	interpret the results performed statistical analyses	FIT_K2_U04
Social competences: (Within the scope of competence, the graduate is ready to)	K1	prepare a report on performed analyzes and present the environmental spatial data in the form of tabular and graphical, and characterize the basic features of the analyzed set	FIT_K2_K01
Course content ensuring the achievement of learning outcomes:		Students perform statistical analyses of environmental spatial data. They know the advantages and disadvantages of different sampling strategies and monitoring concepts. Students are able to select appropriate statistical procedures and tests to find structures and relations in the data and to justify statements.	
Examination methods:		Written exam	

Subject name:		Close to Nature Silviculture & Nature Conservation	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	methods, techniques and technologies used in the field of forest environment management	FIT_K2_W07
	W2	processes for natural resource development and increased economic efficiency of forest management	FIT_K2_W09
Skills: (In terms of skills, the graduate can)	U1	plan, execute, analyse and assess activities related to forestry	FIT_K2_U06
	U2	analyse problems of forest management from social, financial, material, natural and technical point of view in order to create and introduce optimal solutions	FIT_K2_U07
Social competences: (Within the scope of competence, the graduate is ready to)	K1	to take professional, social and ethical responsibility on the state and development of natural environment	FIT_K2_K02
Course content ensuring the achievement of learning outcomes:		To get the students acquainted with the basic concepts, terms, terminology and methods of close-to-nature silviculture (CNS) as a core component of modern, multifunctional forestry under global changes. After the course, the students should be able to plan different types of silvicultural actions (relating to forest reproduction and forest tending) in various categories of forest stands, with a special reference to Central European conditions.	
Examination methods:		Test (written or computer based), Pass, Project	

Subject name:		Forest engineering and utilization	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the methods, techniques and technologies of data acquisition for the characterization and classification of the forest environment elements necessary to design engineering infrastructure	FIT_K2_W04
	W2	the principles of the management of forest engineering in order to effectively implement the productive and non-productive functions of the forest.	FIT_K2_W08
	W3	forest resources and wood processing possibilities	FIT_K2_W03
Skills: (In terms of skills, the graduate can)	U1	acquire, process, integrate, and present information on the quality of wooden raw material, logging, its transport and forest engineering using modern technologies	FIT_K2_U08
	U2	assess the condition of the existing engineering infrastructure	FIT_K2_U09
Social competences: (Within the scope of competence, the graduate is ready to)	K1	make independent decisions to critically evaluate activities in the field of primary forest use and forest engineering.	FIT_K2_K03
Course content ensuring the achievement of learning outcomes:		Acquainting students with the use of forests in Europe and the world, knowledge about the basic European tree species and assortments of wood. Acquainting students with the use of forests in Europe and the world, knowledge about the basic European tree species and assortments of wood.	
Examination methods:		Report, Project, Assessment of activity during classes	

Subject name:		Forest policy and economics	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	basic legislation, regulations and legal procedures concerning the forest policy in the international context	FIT_K2_W09
	W2	social responsibility and professional ethics for shaping natural environment and responsibility for its condition; responsibility towards various social groups	FIT_K2_W11
Skills: (In terms of skills, the graduate can)	U1	analyze economic consequences of activities carried out in forestry and conduct actions in crisis situations, is able to work independently and in a team playing different roles	FIT_K2_U05, FIT_K2_U08
Social competences: (Within the scope of competence, the graduate is ready to)	K1	create forest policy, proposes solutions that helps to develop local community	FIT_K2_K03
Course content ensuring the achievement of learning outcomes:		Students understand the role of forestry in modern world forest biodiversity protection programmes, global environmental concerns, forest research and forestry institutions, global perspective on forest policy, forest certification systems. They also know economic basis for analysis and evaluation of economic undertakings in forestry. Economic aspects of sustainable, multifunctional forest management.	
Examination methods:		Project	

Subject name:		Applied GIS programming	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the representations of geometric objects and the possibility of their creation with the use of the programming language	FIT_K2_W01, FIT_K2_W02
	W2	available modules that provide GIS functions to manage spatial data with the use of the programming language	FIT_K2_W03, FIT_K2_W04
Skills: (In terms of skills, the graduate can)	U1	create geometric objects and performs geometric operations on spatial data with the use of the programming language	FIT_K2_U01
	U2	prepare maps with the use of the programming language	FIT_K2_U01
Social competences: (Within the scope of competence, the graduate is ready to)	K1	proper determination of the priorities for the implementation of specified tasks	FIT_K2_K01
Course content ensuring the achievement of learning outcomes:		Students are able to create a Python GIS environment. Read/write spatial data from/to common file formats. They understand methods related to defining and creating geometric objects with Python. They can manage coordinates reference systems, geometric operations and spatial analyses.	
Examination methods:		Report, Project	

Subject name:		Environmental data analysis and modeling	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the basic statistical measures and their use in the description of environmental spatial data	FIT_K2_W05
	W2	the concepts of estimation statistical estimation, statistical testing, planning experiments, analysis of variance, and regression and correlation	FIT_K2_W07
	U1	choose the appropriate method for the problem being solved and perform analyzes with statistical software	FIT_K2_U07, FIT_K2_U10
	K1	prepare a report on performed analyzes and present the environmental spatial data in the form of tabular and graphical, and characterize the basic features of the analyzed set	FIT_K2_K02, FIT_K2_K05
Course content ensuring the achievement of learning outcomes:		Students are able to understand the use of the statistical programming environment for practical statistical problem-solving. The following chapters are handled: data preparation and processing, statistical software, sampling, sampling and sample size determination, estimation procedures, testing statistical hypotheses, multiple and multi-variance methods (non-linear regression, analysis of variance and covariance), non-linear regression, analysis of variance, mixed-effects models.	
Examination methods:		Project, Presentation	

Subject name:		GIS in forest practice	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the methods of calculating forest metrics based on the field measurements and spatial data	FIT_K2_W08
	W2	accuracy analysis of different methods used for assessment forest metrics	FIT_K2_W08
Skills: (In terms of skills, the graduate can)	U1	plan and conduct experiments, including computer measurements and simulations	FIT_K2_U02
	U2	make the proper selection of data sources and information. Critically evaluate, synthesize, interpret and present this information.	FIT_K2_U03
Social competences: (Within the scope of competence, the graduate is ready to)	K1	critical evaluation of knowledge and received content	FIT_K2_K01
	K2	fill social obligations, inspire and organize activities for the social environment	FIT_K2_K03
	K3	initiate activities for the public interest	FIT_K2_K04
Course content ensuring the achievement of learning outcomes:		The concept of this module is base on combining different data sources (LiDAR, filed measurements, GNSS and UAV) and different techniques (GIS, remote sensing, map algebra, tree segmentation) in order to get detailed forest metrics.	
Examination methods:		Assessment of speeches during classes, Project	

Subject name:		Forest Photogrammetry	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the methods of using electromagnetic radiation to characterize the natural environment	FIT_K2_W02
	W2	the methods of estimating, measuring, describing, visualizing and assessing the accuracy of image data and the possibilities of their use in forestry	FIT_K2_W07
Skills: (In terms of skills, the graduate can)	U1	interpret remote sensing images towards recognizing land cover classes	FIT_K2_U02
	U2	interpret symptoms and phenomena of a disaster character in remote sensing images	FIT_K2_U06
Social competences: (Within the scope of competence, the graduate is ready to)	K1	make independent decisions based on the collected, processed and correctly interpreted remote sensing data	FIT_K2_K04
Course content ensuring the achievement of learning outcomes:		The aim of the course is to introduction students with the methods of acquiring, processing and interpreting image information (satellite images, aerial photos and low-altitude UAV-images) to assess the condition and changes in the environment of forest areas.	
Examination methods:		Project, Report	

Subject name:		Digital Processing of Remotely Sensed Data	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	fundamental concepts of remote sensing and its environmental applications	FIT_K2_W03
	W2	state-of-the-art methods and techniques of remote sensing	FIT_K2_W02
	W3	techniques in change detection analyses	FIT_K2_W05
Skills: (In terms of skills, the graduate can)	U1	access to Earth Observation data	FIT_K2_U01
	U2	use preprocessing skills of satellite data	FIT_K2_U03
Social competences: (Within the scope of competence, the graduate is ready to)	K1	apply remote sensing methods with satellite data in environmental science and forestry	FIT_K2_K01
Course content ensuring the achievement of learning outcomes:		Students understand technical skills in processing of satellite images and current trends in remote sensing. They can introduce the increasingly important spaceborne technologies with satellite images, and prepare to tackle pressing environmental problems with advanced methodologies: machine learning algorithms, hyperspectral data, texture analysis, image/sensor fusion, etc.	
Examination methods:		Presentation, Case, Report	

Subject name:		Forest inventory and modelling	ECTS: 2
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the mathematics and natural sciences, enabling self-construction, alternative solutions to problems related to forest inventory and modelling	FIT_K2_W05, FIT_K2_W06
	U1	plan, conduct, analyze and interpret research in inventory and modelling in forestry	FIT_K2_U04, FIT_K2_U06
	K1	to recognize the importance of knowledge in solving cognitive and practical problems in the field of forest inventory and modelling.	FIT_K2_K03
Course content ensuring the achievement of learning outcomes:		Students understand the statistical fundamentals of forest inventory for planning and evaluating inventories. They recognize the representative methods, sampling frame construction, sample design, estimation methods, sampling error, and examples of forest inventory using various designs.	
Examination methods:		Project	

Subject name:		Scientific Internet Colloquium	ECTS: 3
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	the functioning of forest ecosystems, landscape and biosphere	FIT_K2_W06
	W2	the different scientific approaches and methodological concepts of various disciplines in the environmental field	FIT_K2_W10, FIT_K2_W11
Skills: (In terms of skills, the graduate can)	U1	derive IT-related tasks, develop, and implement solution strategies	FIT_K2_U03
	U2	recognize threats to ecosystems, create methods for their detection, monitoring and research	FIT_K2_U06
Social competences: (Within the scope of competence, the graduate is ready to)	K1	setting priorities for the implementation of a task defined by oneself or others for the purpose of effective management, critical analysis of knowledge resources, and searching for its sources among experts	FIT_K2_K01
	K2	perform professional roles responsibly, taking into account the development of the achievements of the forestry profession, maintaining the ethos of the profession, and observing and developing the principles of professional ethics.	FIT_K2_K04
Course content ensuring the achievement of learning outcomes:		Students are able to discover new areas of IT applications, extend and manifest their capacities for accomplishing scientific work including academic writing and reviewing scientific papers in an seminar.	
Examination methods:		Report, Presentation	

Subject name:		Scientific or technical research project	ECTS: 15
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
Knowledge: (In terms of knowledge, the graduate knows and understands)	W1	issues related to the planning and implementation of a research project	FIT_K2_W11
	W2	methods, techniques and technologies used in the field of forest environment management	FIT_K2_W06, FIT_K2_W07
Skills: (In terms of skills, the graduate can)	U1	think and act in an entrepreneurial way and to make decisions based on rational premises	FIT_K2_U09
	U2	plan and implement their own lifelong learning	FIT_K2_U10
Social competences: (Within the scope of competence, the graduate is ready to)	K1	to perform professional roles responsibly, taking into account the development of the achievements of the forestry profession, maintaining the ethos of the profession, and observing and developing the principles of professional ethics	FIT_K2_K04
Course content ensuring the achievement of learning outcomes:		Students are enabled to plan and accomplish a particular research project of moderate size and consolidated their senior level of graduate academic maturity concerning their thematic focus.	
Examination methods:		Project	

Subject name:		Research colloquium	ECTS: 4
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the different scientific approaches and methodological concepts of various disciplines in the environmental field	FIT_K2_W10
	U1	think and act in an entrepreneurial way and to make decisions based on rational premises	FIT_K2_U09, FIT_K2_U10
	K1	to perform professional roles responsibly, taking into account the development of the achievements of the forestry profession, maintaining the ethos of the profession, and observing and developing the principles of professional ethics	FIT_K2_K04
Course content ensuring the achievement of learning outcomes:		Students acquire further skills in interdisciplinary scientific work. They are able to evaluate research projects and to communicate results to expert and professional audience.	
Examination methods:		Presentation	

Subject name:		Master thesis	ECTS: 20
Effects:		The content of the effect assigned to the subject:	Directional effect reference:
<p>Knowledge: (In terms of knowledge, the graduate knows and understands)</p> <p>Skills: (In terms of skills, the graduate can)</p> <p>Social competences: (Within the scope of competence, the graduate is ready to)</p>	W1	the different scientific approaches and methodological concepts of various disciplines in the environmental field	FIT_K2_W11
	W2	the functioning of forest ecosystems, landscape and biosphere	FIT_K2_W06
	U1	think and act in an entrepreneurial way and to make decisions based on rational premises	FIT_K2_U10
	U2	manage teamwork at various levels of management in in the forest and environmental sector	FIT_K2_U08
	K1	recognize the importance of knowledge in solving problems	FIT_K2_K03
	K2	perform professional roles responsibly, taking into account the development of the achievements of the forestry profession, maintaining the ethos of the profession, and observing and developing the principles of professional ethics	FIT_K2_K04
Course content ensuring the achievement of learning outcomes:		The aim of the course is to write a master's thesis by the student. Students should properly and freely use the knowledge and skills acquired during the studies. Methodological skills must be extended with knowledge gained on the basis of the literature on the subject and substantive, constructive analysis of the issue selected for the subject of the master's thesis.	
Examination methods:		Oral exam, 2 reviews	

Programme indicators

Name	Value
Potwierdzenie - na podstawie planu studiów, że student realizuje zajęcia z dziedziny nauk humanistycznych i/lub społecznych, którym przypisano nie mniej niż 5 punktów ECTS	5
Potwierdzenie - na podstawie planu studiów, że student ma możliwość wyboru zajęć, którym łącznie przypisano liczbę punktów ECTS nie niższą niż 30% ECTS określonych dla programu tych studiów	77/120 (64.17%)
Potwierdzenie, że program studiów o profilu ogólnoakademickim obejmuje zajęcia związane z prowadzoną w uczelni działalnością naukową, w wymiarze większym niż 50% liczby punktów ECTS, określonej dla programu tych studiów	73/120 (60.83%)
Potwierdzenie, że liczba punktów ECTS uzyskanych w programie studiów poprzez realizację zajęć z wykorzystaniem metod i technik kształcenia na odległość jest nie wyższa niż 75% ogólnej liczby punktów ECTS w programie studiów o profilu ogólnoakademickim	0/120 (0%)
Liczba godzin w programie	1044