

Description of study programme

Title of study programme	Water and land Engineering
Code of study programme	6121EX031
Area of studies	Engineering Sciences
Field of studies	Environmental Engineering
Specializations of study programme	Aquaculture Engineering, Water Resources Engineering, Land Use Planning
Cycle or type of studies	First cycle
Mode of studies and duration (in years)	Full time (4 years)
Volume of study programme in credits	240
Degree and (or) professional qualification to be awarded	Bachelor of Engineering Sciences
Minimum educational background	Secondary
Study programme language	Lithuanian, English

Annotation

The aim of the study programme „Water and Land Engineering“– to train highly qualified specialists of engineering, who are aware of modern environmental engineering science theories, methods and advanced technologies, to develop abilities to analyse phenomena occurring in living nature, to evaluate the quality of the surrounding environment, to solve the problems of sustainable land and water resources engineering, to realize innovative technical and technological solutions in various fields of cultural landscape formation, land and water management.
Bachelor of Engineering Sciences qualification in Water and Land Engineering is awarded after graduation of studies.

Learning outcomes

Knowledge and abilities

1. to know and understand the basics of natural sciences and mathematics required to understand the fundamentals of environmental engineering;
2. to know the broader multidisciplinary context of engineering, to be able to apply the methods and processes of other scientific fields in solving the problems of sustainable land use and water resources;
3. to know and systematically understand the basic theoretical and applied basics and concepts of environmental engineering, to be able to identify environmental phenomena, international and national environmental and sustainable development problems and their causes, to have coherently related knowledge in the field of environmental engineering;

Engineering analysis

4. to be able to apply knowledge and understanding to identify and solve environmental engineering problems by selecting appropriate analytical and modeling techniques, experimental and production equipment;

Engineering design

5. to be able to apply environmental engineering knowledge, methodologies and special computer programs in designing engineering systems or elements for improvement of environmental quality, to model their processes;

Fundamental and applied research

6. to be able to find relevant scientific and professional information by using databases and other sources of information;
7. to use modern laboratory and field research equipment to conduct experiments, process and evaluate data and report findings;

Solution of engineering tasks

8. to be able to choose and apply appropriate methods, tools and equipment for the implementation of environmental engineering solutions, to know the design, principles, functions and basic skills of the use of engineering equipment;
9. to understand the principles of organization of engineering activities, the importance and basic requirements of work and fire safety, the interaction of chains of engineering activities, be able to combine theoretical and applied knowledge in solving engineering problems;
10. to understand and assess the current environmental situation, predict the likelihood and magnitude of

environmental impact, its components and humans, ethical, environmental and commercial considerations of engineering, select or model environmental control and pollution prevention measures;

Social and personal abilities

11. to holistically understand the impact of engineering decisions on society and the environment, to adhere to the standards of professional ethics and engineering, to understand the responsibility for engineering activities, to be able to communicate with the engineering community and the general public;
12. to understand the importance and preparation of individual lifelong learning, be able to work effectively independently and in a team, be aware of project management and business aspects, and understand the links between technological solutions and their economic consequences.

Description of practice

In the second semester, a general practice in Geodesy is taught for all specializations, 4 credits.

The following practices are foreseen in the fourth semester: Aquaculture Engineering Specialization - Aquaculture Practical Training, 6 credits; Water resources engineering specialization - Fieldworks for Water Engineers, 6 credits; Land Use Planning Specialization - Surveying Practical Training, 5 credits. In addition to specific research, these internships also include visits to practical-production companies to get students closer to what they are doing.

In the sixth semester students do Practice of Professional Activity in the company of their choice (Aquaculture Engineering Specialization - 8 credits, Water resources engineering and Land Use Planning Specializations - 6 credits each). During the internship, the student is advised by a supervisor at the institute and a supervisor at the company. In practice, the data collected can be used as a basis for writing a thesis.

Career opportunities

Graduates will be able to work:

design - engineering work

- for water engineering: in the design, construction, maintenance and management of hydraulic structures, in water supply and sewage disposal and waste management institutions
- companies preparing land use planning and land management projects, carrying out cadastral surveys of land and buildings, land mapping, preparation of land plans, landscape architecture, land market research and real estate valuation
- public and private fisheries and aquaculture enterprises,
- environmental management, design and maintenance companies, municipal administrations, regional environmental departments;

consulting work in consulting companies, services, municipal administrations,

studies can be continued in the Master's degree programs in the field of engineering.

Curriculum: study plan

Year I			
Semester	Titles of courses	Codes of courses	Credits
First	Environmental Chemistry	VZI1001	6
	Basics of Environmental Engineering	VŽVIB111	4
	Engineering Graphics	VŽHSB120	4
	Higher Mathematics	MAT1006	6
	A courses		6
	B courses		4
	Totally in semester:		
Second	Physics	VZI1003	4
	Basics of Geodesy	VŽŽGB092	6
	Practical Training of Basics of Geodesy	VŽŽGB079	4
	Optimization Methods and Basics of Statistics	MAT1027	6
	A courses		6
	B courses		4
	Totally in semester:		

Aquaculture Engineering Specialization

Year II			
Semester	Titles of courses	Codes of courses	Credits
Third	Geographic Information Systems	VŽŽGB084	6
	Computer Graphics	VŽHSB121	4
	Hydraulics	VŽHSB019	6
	Aquatic Organisms and Aquaculture Systems	VŽHSB123	6
	A courses		4
	B courses		4
	Totally in semester:		
Fourth	Soil Science	AFADB058	4
	Spatial Planning	VŽŽGB096	6
	Professional Language of Engineering Sciences	VZI2002	4
	Engineering Hydrology and Geohydrology	VŽVIB112	6
	Aquaculture Practical Training	VŽHSB125	6
	A courses		4
	Totally in semester:		
Year III			
Semester	Titles of courses	Codes of courses	Credits
Fifth	Basics of Building Construction	VŽHSB126	4
	Shellfish and Crustacean Biotechnology	VŽHSB127	4
	Technologies for Breeding and Rearing of Warmwater Fish	VŽHSB128	6
	Water Treatment and Supply for Aquaculture	VŽHSB129	4
	Fishing Technologies	VŽHSB130	4
	A courses		4
	B courses		4
Totally in semester:			30
Sixth	Environmental and Construction Law	VŽHSB082	4
	Aquaponics	VŽHSB131	4
	Technologies for Breeding and Rearing of Coldwater Fish	VŽHSB132	6
	Course Project of Aquatic Animal Breeding and Rearing Technologies	VŽHSB133	4
	Practice of Professional Activity	VŽHSB134	8
	A courses		4
	Totally in semester:		
Year IV			
Semester	Titles of courses	Codes of courses	Credits
Seventh	Engineering Solutions for Aquaculture	VŽHSB147	4
	Aquaculture Production Technologies	IFEBB146	6
	Biosafety in Aquaculture	VŽHSB135	6
	Marine Aquaculture	VŽHSB136	4
	Aquaculture Wastewater Treatment	VŽHSB137	6
	Feed Production and Feeding Technologies	IFEBB147	4
	Totally in semester:		
Eighth	Fish Stock Assessment and Restoration	VŽHSB142	6
	Complex Project of Aquaculture	VŽHSB143	9
	Final Work of Environmental Engineering	VŽBDB009	15
	Totally in semester:		
Totally in study programme:			240

Water Resources Engineering Specialization

Year II				
Semester	Titles of courses	Codes of courses	Credits	
Third	Geographic Information Systems	VZI2001	6	
	Computer Graphics	VŽHSB121	4	
	Hydraulics	VŽHSB019	6	
	Technical Mechanics	VŽHSB124	6	
	A courses		4	
	B courses		4	
	Totally in semester:			30
Fourth	Soil Science	AFADB058	4	
	Spatial Planning	VŽŽGB096	6	
	Professional Language of Engineering Sciences	VZI2002	4	
	Engineering Hydrology and Geohydrology	VŽVIB112	6	
	Fieldworks for Water Engineers	VŽVIB113	6	
	A courses		4	
	Totally in semester:			30
Year III				
Semester	Titles of courses	Codes of courses	Credits	
Fifth	Basics of Building Construction	VŽHSB126	4	
	Drainage and Irrigation	VŽVIB114	6	
	Course Project of Drainage or Irrigation System	VŽVIB115	4	
	Geotechnics	VŽHSB009	4	
	Basics of Oceanology and Limnology	VŽVIB116	4	
	A courses		4	
	B courses		4	
	Totally in semester:			30
Sixth	Environmental and Construction Law	VŽHSB082	4	
	Engineering Structures	VŽHSB135	6	
	Water Supply and Drinking Water Preparation	VŽHSB136	4	
	Course Project of Water Supply and Drinking Water Preparation System	VŽHSB150	4	
	Sewerage	VŽHSB146	4	
	Practice of Professional Activity	VŽHSB014	6	
	A courses		4	
	Totally in semester:			32
Year IV				
Semester	Titles of courses	Codes of courses	Credits	
Seventh	Hydropower	VŽHSB138	4	
	Hydraulic Structures	VŽHSB139	4	
	Project of Hydraulic Structures	VŽHSB140	4	
	Offshore and Coastal Structures	VŽHSB141	4	
	Flood Risk Management	VŽVIB117	6	
	Renovation of Water Bodies	VŽVIB118	6	
	Totally in semester:			28
	Eighth	Building Information Modeling	VŽHSB122	6
Technology and Organization of Water Engineering Construction Works		VŽVIB119	5	
Project of Technology and Organization of Water Engineering Construction Works		VŽVIB120	4	
Final Work of Environmental Engineering		VŽBDB009	15	
Totally in semester:			30	
Totally in study programme:			240	

Land Use Planning Specialization

Year II			
Semester	Titles of courses	Codes of courses	Credits
Third	Geographic Information Systems	VZI2001	6
	Computer Graphics	VŽHSB121	4
	Sustainable Territorial Development	VŽŽGB093	4
	Cartography	VŽŽGB094	4
	Digital Photogrammetry	VŽŽGB095	4
	A courses		4
	B courses		4
Totally in semester:			30
Fourth	Soil Science	AFADB058	4
	Spatial Planning	VŽŽGB096	6
	Professional Language of Engineering Sciences	VZI2002	4
	Geodetic Measurements	VŽŽGB097	7
	Practical Training of Geodetic Measurements	VŽŽGB089	5
	A courses		4
Totally in semester:			30
Year III			
Semester	Titles of courses	Codes of courses	Credits
Fifth	Basics of Building Construction	VŽHSB126	4
	Land Reclamation and Roads Engineering	VŽVIB060	4
	Real Property Cadastre and Register	VŽŽGB098	8
	Course Project on Land and Buildings Cadastre	VŽŽGB099	4
	Basics of Land Use Planning	VŽŽGB100	4
	A courses		4
	B courses		4
Totally in semester:			32
Sixth	Environmental and Construction Law	VŽHSB082	4
	Environmental Planning	VŽŽGB101	6
	Course Project of Environmental Planning	VŽŽGB102	4
	Landscape Management	VŽŽGB103	4
	Practice of Professional Activity	VŽŽGB026	6
	A courses		4
Totally in semester:			28
Year IV			
Semester	Titles of courses	Codes of courses	Credits
Seventh	Research Methods of Environmental Engineering	VŽŽGB104	6
	Engineering Geodesy	VŽŽGB085	6
	Land Law	VŽŽGB018	6
	Land Use Planning	VŽŽGB105	8
	Project of Land Use Planning	VŽŽGB106	4
	Totally in semester:		
Eighth	Real Property Valuation	VŽŽGB107	7
	Organization of Land Management Works	VŽŽGB108	8
	Final Work of Environmental Engineering	VŽBDB009	15
Totally in semester:			30
Totally in study programme:			240