

Transilvania University of Braşov, Romania

Study program: Natural Hazards and Risk Assessment in Civil Engineering

Faculty: Civil Engineering

Study period: 2 years (master)

1st Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Basic principles of natural hazard	BPNH01	8	6	6		

Course description (Syllabus):

- present an overview of principal natural hazards;
- introduce the principals of hydrological and geomorphological hazards (floods, flash floods, landslides, earthquakes).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Geographical Information Systems for hazard and risk assessment	GIS01	6	2	2		

Course description (Syllabus):

- educate students in Geographic Information Systems (GIS), providing opportunities to analyze data, explore issues, problem solve, and evaluate situations in a geographic and spatial context;
- analyze spatial data, using GIS analysis tools adapted to natural hazard management;
- develop and manage geodatabases;
- relate GIS with remote sensing technologies;
- create maps, images and apps to communicate spatial data in a meaningful way to others.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Ethics and integrity in scientific research	EISR01	3	1	1		

Course description (Syllabus):

- acquiring and applying in the professional career the specific concepts of ethics and academic integrity;
- deontology and integrity in university and scientific research and, implicitly, the development of a culture of responsibility in terms of involvement in the joint effort to prevent, identify and combat possible academic fraud, especially plagiarism.
- developing the capacity to know and master the main points of view regarding academic ethics;
- acquiring the necessary knowledge to understand, respect, develop and implement codes of ethics and academic integrity.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Practical placement	PP01	7				6

Course description (Syllabus):

- the discipline aims to provide students with an initial overview of geographic information systems (GIS), software programs needed to simulate and model natural processes;
- knowledge of computer technologies for processing and analysis of spatial data;
- the ability to use specialized programs (eg ArcDesktop) to create a GIS application;
- the ability to apply GIS, on a case-by-case basis, for the purpose of acquiring, storing, updating, processing, analyzing and displaying information.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Natural hazard and vulnerability assessment	NHVA02	8	6			6

Course description (Syllabus):

- the course presents implementation-oriented concepts, instruments and methods for natural hazards and vulnerability assessment in civil engineering;
- understanding the need for the natural hazards assessment process;
- acquiring theoretical and practical knowledge used in the natural hazards assessment process;
- acquisition of the main principles, structures and methodologies used in the natural hazards assessment process.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Fundamentals of risk assessment	FRA02	6	2			2

Course description (Syllabus):

- the course presents implementation-oriented concepts, instruments and methods for natural hazards risk assessment and risk management in civil engineering;
- understanding the need for the natural hazards risk assessment process;
- acquiring theoretical and practical knowledge used in the natural hazards risk assessment process;
- acquisition of the main principles, structures and methodologies used in the natural hazards risk assessment process.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Sustainable development of the built environment and territorial systematization	SDBT02	6	2	2		

Course description (Syllabus):

- use basic knowledge of fundamental disciplines to identify optimal solutions for sustainable design and construction, using materials and modern technology;
- familiarization of the master students with constructive elements and with the principles of sustainable development, in constructions and architecture;
- creating the skills necessary for the design and optimization of urban planning activities, Smart City - BIM, specific to contemporary constructions;
- development of the capacity to analyze the impact on the environment and territory, of the constructions and development of the capacities of technological adaptation according to the climatic conditions and zoning;
- promoting logical reasoning, convergent and divergent, practical applicability, evaluation and self-evaluation decisions.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Research methods	RM02	6	2		2	

Course description (Syllabus):

- identify appropriate research topics;
- select and define the appropriate research problem and parameters;
- prepare a project proposal (to undertake a project);
- organize and conduct research (advanced project) in a more appropriate manner;
- write a research report and thesis;
- write a research proposal (grants).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(01) Applied statistics for hazard and risk assessment (elective)	AMS01	6	2	2		
(02) Data Analysis (elective)	DA01					

Course description (Syllabus):

- understanding the basic concepts of statistics and applying them to testing hypotheses related to risk and hazard;
- collecting and analyzing data;
- calculation of the basic statistics of some data series;
- determination of the extremes of some data series;
- methods of evaluation of different types of risks and natural hazards;
- testing statistical hypotheses. Detecting the relationships between various data series.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Practical placement	PP02	4			4	

Course description (Syllabus):

- the discipline aims to provide students with an initial overview of natural hazards, as well as the possibilities of monitoring, protection and rehabilitation of the necessary construction works;
- to present to students the main hydrological hazards (river floods, floods, excess rainfall and drought) and geomorphological hazards;
- to use field-specific terms correctly.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Conceptual design for protection works	CWPD03	7	4		4	

Course description (Syllabus):

- development skills regarding the design of landscaping works against floods, landslides and seismic protection;
- design a plan for different protection work.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Disaster Risk management and emergency	RPME03	6	2			2

Course description (Syllabus):

- the course presents implementation-oriented concepts, instruments and methods for natural hazards risk management in civil engineering;
- understanding the need for the natural hazards risk management process;
- acquiring theoretical and practical knowledge used in the natural hazards risk management process;
- acquisition of the main principles, structures and methodologies used in the natural hazards risk management process.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Policies, Regulations and Law	PRL03	6	2			2

Course description (Syllabus):

- identification and use of legal norms and specific technical regulations in the field of natural hazards and disaster protection works;
- presentation of national and international public policies in the studied field;
- developing the capacity to know and master the main legal and technical norms applicable to construction works against natural disasters;
- acquiring competencies regarding the use of legal information in the decision-making field of construction companies;
- acquiring the necessary knowledge to understand, comply with, develop and implement protection measures against natural disasters.

Course title	Code	No. of credits	Number of hours per week			
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Practical Specialization - Experimental Research	PSER03	8				7

Course description (Syllabus):

- offering specific notions of risk management, legal and technical notions applicable in public administration regarding emergencies, civil protection works, etc;
- to present to the students the legal, technical and administrative ways to prevent and signal natural risks, to reduce their effects on the population and the economy, to restore the affected areas, etc;
- to use field-specific terms correctly.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(01) Entrepreneurial Forecasting and Planning (elective)	EFP04	4	2		4	
(02) Economy (elective)	E04					

Course description (Syllabus):

- the course "Forecasting and Entrepreneurial Planning" aims to provide specific information to students in order to acquire the necessary skills for a successful project management. In this sense, the aim is to develop the capacity to develop a project plan, as well as the skills needed to implement and monitor the project.
- acquiring planning and forecasting skills.
- acquiring the specific skills of a project manager.
- learning the methods, techniques and tools needed to develop a project plan.
- tracking the project from the initial phase to completion, applying specific methods.

OR

- basic knowledge of economics must be part of the general culture of the graduate, especially since the field of construction has an important economic component. The discipline "Economics" aims to provide specific information for the training of students in order to acquire the skills necessary for the formation and development of economic thinking and understanding the mechanism of market functioning based on the interaction between supply and demand.
- acquiring in a systemic way the basic knowledge in the field of economics and understanding the concepts used in the field.
- understanding the mechanisms of the real economy.
- learning the methods of knowledge and analysis used in economic theory and practice;
- analysis and interpretation of economic data and information in economic-engineering decision-making processes.

Course title	Code	No. of credits	Number of hours per week			
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Practical Activity for the Preparation of Dissertation Thesis	PA04	20				12
Elaboration of the Dissertation Thesis	ED04	10				6

Course description (Syllabus): these two disciplines are designed to assist students in the preparation of their thesis or dissertation research proposal in the field of their research proposal.