

**MATRIX of existing Master course
(Donbas National Academy of Civil Engineering and Architecture – DonNACEA)**

Name of compulsory courses	Year	Semester	Number of ECTS	Number of elective chairs	List of available elective courses	Short description	Relation between the contents and RETHINK's theme
Master in Civil Engineering							
1st Year, 1st Semester							
1. Dynamic Analysis and Earthquake Engineering	1 st year	1 ^s semester	7	-		Training for analysis, design and assessment of structures under seismic actions and other extreme loading conditions. The syllabi's covers a comprehensive set of topics related to structural dynamics, single and multiple degree freedom systems, earthquake engineering, and advanced numerical techniques.	This course is concerned with the study of how earthquake-induced ground motions affect building structures, the design of such structures to resist earthquake loading, and the control of structures by using sustainable and innovative materials to improve their dynamic response to earthquake loads.
2. Building technology for special buildings and structures	1 st year	1 ^s semester	6	-		Training on the field of modern theoretical basics knowledges as for methods for erection special buildings and structures for achieving better technical and economical results of constructional company. Teaching of modern methods of erection for special structures, (difficult conditions included); to adopt the calculation methods for special loads during erection; teaching the methods for practical using of assembling and rigging arrangements which are under large loads and save assembling structures from destruction.	Low consumption of energy for erection and constructions' technologies.
3. City pipelines and networks (water nets, waste water nets, gas, heat, ventilation supplies nets)	1 st year	1 ^s semester	6	-		To study types of city's engineering networks and systems of life-comfort: energy supplying (gas, electricity, heat), water supply and sewage; teaching of basics of designing, construction and operation city engineering systems and nets. To acquire general knowledges as for planning, building and structural properties for city engineering nets; to reach practical experience in calculation of main parts, net construction for special difficult conditions. To know the actual laws, rules and standards in the field of city engineering nets and utilities.	Utilization of waste waters, solid waste (or treated sludge) as environmentally friendly and suitable for future disposal or reuse. Designing of gas, electricity nets under demands of energy-efficient and energy-saving technologies.
4. Technological works with new constructional materials	1 st year	1 ^s semester	6	-		Preparation for professional work based on knowledges of traditional and new technologies for protecting (isolation, floors, internal and external finishing works) coverings for building and structures which provides maximum efficiency of construction and quality of works. Teaching new technologies of isolation, finishing, floor works for new construction and reconstruction; teaching modern documents, standards, laws, technical rules and methodical documents related with accomplishment of coverings, isolated, finishing and protected materials for buildings; adopt methods of technological documentation's elaboration for coverings,	It aims to lead the sustainability effort and positively impact on the environment through the use of more environmentally sustainable coatings, finishes, another materials and components in buildings

						isolated, finishing and protected works; adopt demands to quality control for these works.	
5. Information technologies for researching	1 st year	1 ^s semester	5	-		To be competent in modern information technologies for solving a wide range of engineering tasks; to have a basic knowledges for programming and modelling of physical processes; to have skills for algorithm making and future it calculation with sufficient programs. Understanding of informational backgrounds of scientific investigations; main principles of optimization mathematical programming, methods of solutions; main principles of statistics analysis; rules for elaboration of mathematics system modelling. A good understanding of the finite element method (FEM) to efficiently model a real life engineering problem is crucial to predict its future behaviour, similarly to the importance of verifying and validating these computational models.	Contributing to development of critical thinking skills, encouraging more sustainable approaches. Stimulate intellectual curiosity, innovation openness and experimentation on sustainable construction and related areas.
ECTS per semester			30				
1st Year, 2nd Semester							
6. Basics of quality management and products certification	1 st year	2 semester	2			To prepare students for professional activity as for problem of products quality management; to be competent making decision and development of quality management in construction; practical realization all factors, parameters and properties which related with quality of products and management of quality in construction. To adopt the methodology of legal supporting of standardization and certification for constructional products' quality; to find influences of humans for function of quality system; to know and constant study an international experiences of management quality in construction.	To manage and access a product qualities with a demands of peoples friendly environment Aims at training highly competent professionals working in strongly framed laws limits. To be expert through actual laws in construction
7. Special building structures (steel, composite and reinforced concrete)	1 st year	2 semester	6			The aim of this module is to introduce students to the design of structures in steel, reinforced concrete and composite. The overall objective is to enable students to develop an understanding of the fundamental concepts and design philosophies related to steel, reinforced concrete and composite elements and to apply this knowledge to the design of conventional building structures. Students are introduced to European design guidelines (Eurocodes).	Constructional solutions for special steel, reinforced concrete and composite structures; basics of calculation and designing; demands for exploitation of structures; appliances steel, reinforced concrete and composite structures for different buildings
8. Experimental investigations for building structures	1 st year	2 semester	6			To know methods and tools for experimental investigations. To know structures' modelling principles. To know conditionality of experiment and adaptation rules to real structure. To adopt experimental investigations' methods for building structures and experimental models' creatures work; to be competent in experimental methods for stress-strain conditions determination.	This course aims at improving structural reliability and safety on the basis of experimental investigations
9.1. Environmental engineering	1 st year	2 semester	2			To develop skills inside designing crew for elaborate project's documentations and improve proficiency in designing activity. To teach students for methods of preparing project section	Initial data preparation; elaboration "Environmental Engineering" (EE) section in the general project of a new building; adjustments of

Special course						“environmental engineering” on the beginning stages of investment process (investigations, business plan preparation, designing).	all projects’ parts after “EE” section preparation
9.2. Designing of energy efficient and energy saving construction	1 st year	2 semester	3			To provide knowledges about modern situation as for energy-saving and energy-efficient constructional technologies; to apply knowledges for conditions of real enterprise; to help to increase wishes for implementation new technologies in professional activities for different life’s range. To study analytical methods of energy utilization efficiency and energy-saving ways for production company; to develop and embed social-psychological peculiarities of energy-saving management; to calculate energetic balance for constructional company.	This course aims to improve the environmental comfort in buildings, through the definition in designing an energy efficient and energy saving solutions
10. Repair, reconstruction and reinforcing of building structures	1 st year	2 semester	6			Teaching rules and demands for technical investigation of building structures; basics of repair, reconstruction and reinforcement (strengthening); calculations and designing works for reconstruction; practical experience for projects and technological documentations preparation. To know how to determinate materials’ characteristics of building structures; to learn the rules of technical investigations for buildings and structures; to teach typical defects and damages for building structures; to know actual law and normative Ukrainian documents in the field of repair, reconstruction and strengthening of building structures; to use special rules and demands for designing and technological documentation for reconstruction.	This course aims at promoting of repairing, conservation and rehabilitation of existing buildings with the demands of life conditions’ improvement
11. Introduction to Scientific Researches in Civil Engineering	1 st year	2 semester	2			Capacity to integrate knowledge, to relate data and compare different methods, to develop solutions and produce judgments using limited or incomplete information. Stimulate reflections on findings and development of implications, enhances an understanding of ethical dilemmas and the responsibilities of researchers in applied science.	This course aims at raising standards of ethical practice and social responsibility within the built environment. Ethics and sustainability in construction are related to economic progress, social responsibility and environmental concerns in an integrated way.
ECTS per 2nd semester			30				
Total per 1st year			60				
2nd Year, 1st and 2nd Semesters							
12. Pre-stressed Structures and Prefabrication	2 nd year	1 semester	6			Prefabricated concrete; design methods, tolerance, floor and roof systems, wall panels and construction joints. Prestressed concrete; basic principles, methods and systems of prestressing, partial loss of prestressing, analysis and design for flexural, shear, bond and bearing. Capacity to design systems with prestressing techniques and precast philosophy.	Prefabrication plays an important role in structural concrete construction and is evolving to cope with current society’s habits and needs related to the built environment. Industrialized construction may bring cost efficiency, good quality and environmentally friendly solutions, able to adapt to market demands.
13. Support Structure and Improvement of Soil	2 nd year	1 semester	6			Design of retaining and sheet-pile walls according to global and partial safety factors (Eurocode 7). Application of appropriate techniques for soil improvement and reinforcement. Ability to produce reports on improvement in soils and carry out expert inspection on retaining wall structures. Safety design of various	Soil is a fundamental and ultimately finite resource that fulfils a number of functions and services for society which are central to sustainability. Some of the most significant impacts on this resource occur as a result of activities associated with construction activity,

						types of retaining walls according to European Standards and selection of the most appropriate method to ground improvement in different soil conditions.	and this course develops awareness and understanding of this need within the construction industry.
14. Transportation systems. Planning and Management	2 nd year	1 semester	3			Training students to analyze transportation systems and develop mobility management projects with a strong focus on urban systems. It provides students with the knowledge to understanding intelligent transportation systems and participate in the development of sustainable mobility plans by developing the capacity to integrate all the main aspects inherent to transportation planning	Traditional transport planning aims to improve mobility, reducing environmental and social impacts, and managing traffic congestion
15. Management and economics for building enterprise	2 nd year	1 semester	3			Training student to receive specific knowledges for employer/businessman activity with aspects in constructional branch; to provide information as for world's progress market decisions and nuances for building company. To study general rules for starting of employer/businessman activity; to make analysis of modern experience for constructional enterprise; to prepare business plan for company and to be competent in building license demands.	Methods for business activity starting on the basis of law demands and marketing analysis
Pedagogic practical training	2 nd year	annual	2			Aim: To begin to be competent as a teacher. To know basics principles of educational process with the teacher's point	Experience for improvement pedagogic skills
Scientific practical training	2 nd year	annual	4			Aim: To begin to be competent as a scientist. To know basics principles of scientific research, actual documents and demands for scientific works (papers, dissertations, articles, etc.) preparation. To be ready to introduce, present and defence own scientific results	Experience for improvement scientific skills
Project/ Dissertation	2 nd year	annual	36			Development of the project work with the elaboration of the final document. Development of the dissertation work with the elaboration of a final document	Aim: Linking the objectives of sustainable development with energy efficient, energy saving technologies. To present own scientific result(s).
Total			60				
Total - Master Degree:	2 years	4 semesters	120			This Master degree is an interdisciplinary program. The broad objective of this master degree is to develop awareness to create built environments that are livable, comfortable, safe and productive, educating future professionals in the concepts of sustainable development.	It intends (i) to provide a holistic, systems perspective to the impact of human activity on the environment, including the role of engineering; (ii) to educate students in the concepts of sustainable development; (iii) to provide insight into sustainability tools such as life cycle analysis and ecological footprint; (iv) to show how engineering decisions, particularly design, can support sustainability goals, and (v) to develop awareness of the ethical, economic, social and political dimensions that influence sustainability