UNIVERSITY OF RIJEKA

FACULTY OF CIVIL ENGINEERING

PROFESSIONAL UNDERGRADUATE **STUDY** PLAN AND PROGRAM

CIVIL ENGINEERING

Rijeka, September 2024

CURRICULUM

Professional Undergraduate Study
CIVIL ENGINEERING

Information about the leader:

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1. INTRODUCTION

During the implementation of the Bologna Process, the Faculty of Civil Engineering in Rijeka envisages reforming the existing study programmes (university, professional and postgraduate studies) according to the principles of the Bologna Process, i.e. according to the settings of the European Credit Transfer System (ECTS), in order to enable student mobility in the single European Knowledge Area.

The Faculty of Civil Engineering in Rijeka began to organize and implement the study of civil engineering in 1976. During its 46 years of operation, a total of **1355 graduate engineers** at the University of **Rijeka and 1431 engineers** at the professional study have graduated from the Faculty of Civil Engineering in Rijeka.

In developing new study programs, the Faculty was guided by previous experiences in the education of construction personnel. The needs of the labor market were taken into account and the assessments of the requirements that will be set before future students, the Faculty and its employees, and experts in the construction profession for the purpose of Croatia's integration into the European Knowledge and Work Area. The fact that the Faculty of Civil Engineering in Rijeka is the only higher education institution that educates construction personnel in the wider area (Primorje-Gorski Kotar County, Istria County, Lika-Senj County) is respected.

Due to today's intensive activity in the field of planning, design and construction of infrastructure (roads, residential areas, water supply systems, etc.), there is a great need for highly educated personnel in the construction profession. The data show that there are **generally no unemployed graduate engineers and civil engineers at the employment services.**

It can be said with certainty that the trend of intensive infrastructure construction will continue in the coming years (during Croatia's approximation and accession to the European Union). In the long run, the need for planning and designing new buildings will be transformed into the need for management, maintenance and reconstruction of communal infrastructure and systems. Therefore, part of the curriculum is adapted to this requirement as well.

During the development of curricula, the Faculty actively cooperated with related faculties of civil engineering in Croatia. The curriculum, at the level of professional studies, is **fundamentally harmonized with equivalent programs at other faculties of civil engineering in Croatia** in order to enable student mobility, in the first step, at the level of Croatia.

When designing the programmes (undergraduate and graduate), the curricula of reputable foreign institutions that educate staff of the same profile (Technical University of Prague, Technical University of Munich: Technische Universität München-Studienplan für studierende des Bauingenieurrwesens, Eidgenossiche Technische Hochschule Zürich-ETH-Abteilung für bauingenieurrwesen) were considered. The recommendations of the Association of Civil Engineering Faculties of Europe (European Civil Engineering Education and Training - EUCEET) were taken into account through coordination within the TEMPUS project «Restructuring and Updating of Civil Engineering Curriculum» (in which all 4 civil engineering faculties from Croatia and international experts and scientists also cooperated).

All teachers of the Faculty **were actively involved in the development of the curricula**, and students were also consulted. The structure of the curricula was adopted by the Scientific and Teaching Council of the Faculty of Civil Engineering on December 21, 2004.

The adopted scheme according to the cycles of education in the professional study is «3+2», i.e.:

- *three-year professional undergraduate study of civil engineering*
- *two-year professional graduate study of civil engineering*

The curriculum has been adapted to the settings of the Bologna Process, the content and methodology has been modernized, and the electiveness has been increased by offering a larger number of subjects. The envisaged directions are taken from the existing structure of the study: the orientation of building construction and the orientation of civil engineering.

The professional undergraduate study is a basic study for the education of construction professionals who participate in the development of projects, in the construction or supervision of the construction of simpler buildings or systems.

2. GENERAL PART

2.1. NAME OF THE STUDY

The name of the study is PROFESSIONAL UNDERGRADUATE STUDY OF CIVIL ENGINEERING.

2.2. HOLDER AND CONTRACTOR OF THE STUDY

The holder and contractor of the study program is the *Faculty of Civil Engineering in Rijeka* with its basic teaching units: Department of Geotechnics, Department of Hydraulic Engineering, Department of Computational Modeling of Materials and Structures, Department of Structures, Department of Organization and Technology of Construction, Department of Architecture and Urban Planning, Department of Roads, Department of Technical Mechanics, Department of Mathematics, Department of Physics and other subjects.

2.3. DURATION OF STUDY

At the Faculty of Civil Engineering, the professional undergraduate study of civil engineering lasts three (3) academic years, and upon completion of the study, the student acquires a minimum of 180 ECTS credits.

2.4. CONDITIONS FOR ENROLMENT IN THE STUDY

A candidate who has a high school diploma or an appropriate professional degree for at least four years or according to the conditions set out in a special ordinance of the Faculty has the right to apply for enrolment in an professional undergraduate study programme.

Citizens of the Republic of Croatia and citizens of EU Member States have the right to apply for the study, and under the same conditions, foreign citizens and stateless persons have the right to apply.

The selection of applicants for enrolment in the professional undergraduate study is made on the basis of their success in secondary school (grade point average through all four grades and the compulsory part of the State Matura) and the results of the compulsory (Mathematics) and elective (Physics or Chemistry or Informatics) part of the State Matura. The elective part of the state graduation exam is not Compulsory, but by passing the elective part, the applicant earns additional points.

2.5. COMPETENCIES THAT THE STUDENT ACQUIRES UPON COMPLETION OF THE STUDY

Upon completion of the professional undergraduate study , the student acquires basic competencies for understanding the construction process, methods for design and dimensioning in the field.

He/she is qualified to participate in the preparation of static calculations in concrete, wood and metal and to participate in the planning and design of parts of hydrotechnical and traffic structures.

He/she is qualified to participate in the design and dimensioning of simpler buildings or parts of complex buildings, managing the construction of simpler civil engineering and building construction facilities.

The student acquires the ability to articulate information, problems and solutions to certain problems of the profession in writing and orally, as well as to manage a group of people on works in the field of construction.

The knowledge and competencies that the student acquires by completing the professional study are sufficient to follow the specialist graduate professional program at the Faculty of Civil Engineering in Rijeka and to follow similar programs at other faculties of civil engineering in the Republic of Croatia. He/she can follow graduate specialist professional programs of other related, technical studies. The student has the knowledge and competencies to engage in various forms of lifelong learning.

2.6. PROFESSIONAL TITLE OR DEGREE ACQUIRED UPON COMPLETION OF STUDIES

Upon completion of the professional undergraduate study, the student acquires the professional title: *Bachelor (baccalaureus/baccalaurea) in Civil Engineering,* abbreviation: *bacc. ing. aedif.*

3. PROGRAMME DESCRIPTION

3.1. LIST OF COMPULSORY AND ELECTIVE COURSES with the number of hours of active teaching required for their performance and the number of ECTS credits

3.1.1. List of compulsory subjects

Ordinal	*Label*	*Compulsory subjects*	*Number of hours of active teaching (L+E+S)**	*ECTS*
1.	AU-761	Architectural Structures I	30+30+0	5.0
2.	AU-762	Architectural Structures II	30+30+0	4.0
3.	P-775	Introduction to Road Design	30+30+0	4.5
4.	NK-741	Timber Structures	36+24+0	5.5
5.	OT-770	Construction Economics	30+30+0	5.0
6.	FD-794	Physics	30+15+0	4.0
7.	P-776	Geodesy	30+15+0	4.0
8.	M-786	Geometric Graphics I	15+0+30	3.5
9.	M-788	Geometry Graphics II	15+0+15	3.5
10.	G-705	Geotechnical Engineering	30+20+0	4.5
11.	OT-768	Civil Engineering Regulations	30+0+0	2.0
12.	MK-721	Civil Engineering Materials	30+30+0	5.0
13.	M-791	Engineering Informatics	15+30+0	3.5
14.	M-785	Mathematics I	30+30+0	6.5
15.	M-790	Mathematics II	30+15+0	5.0
16.	OT-764	Construction Management	45+30+0	6.5
17.	NK-737	Basics of Concrete and Masonry Structures	30+30+0	5.5
18.	AU-765	Introduction to Design I	30+30+0	4.0
19.	AU-767	Introduction to Spatial Planning	30+0+15	4.0
20.	G-707	Applied Geology	20+10+0	2.5
21.	M-789	Computer Applications	5+40+0	3.5
22.		Foreign language (English or German)	30+0+15	3.5
23.	OT-771	Vocational Practice	0+360+60	15.0
24.	TM-741	Technical Mechanics I	30+30+0	4.5
25.	TM-742	Technical Mechanics II	30+30+0	5.5
26.	OT-763	Construction Technology	30+15+0	3.5
27.	FD-793	Physical Education	0+30+0	1.0
28.	H-716	Hydraulic Structures	30+30+0	5.5
29.	G-704	Environmental Protection	15+0+15	3.0
30.	ZR-STR	Final Year Project	0+0+60	15.0

*L+E+S: lectures + exercises + seminars

During the academic year, certain sports activities are organized for students coordinated through the subject of Physical and Health Education.

3.1.2. List of elective courses

Ordinal	*Label*	*Elective courses*	*Number of hours of active teaching (L+E+S)**	*ECTS*
31.	NK-740	Concrete and Masonry Structures	30+30+0	5.5
32.	NK-742	Steel Structures	30+30+0	5.5
33.	FD-795	English Language	30+0+15	3.5
34.	H-717	Installations	30+25+0	4.0
35.	NK-739	Prefabricated Structures	30+20+10	5.5
36.	NK-738	Bridges	30+15+0	4.0
37.	FD-796	German Language	30+0+15	3.5
38.	H-712	Coastal Structures	30+30+0	5.5
39.	ID-700	Sustainable Urban Transport Infrastructure	20+15+10	3.0
40.	H-718	Water Supply and Sewerage	30+30+0	5.5
41.	P-772	Introduction to Urban Roads and Intersections	30+30+0	5.5
42.	FD-797	Introduction to Language Culture	15+15+0	2.0
43.	AU-772	Introduction to Design II	30+30+0	5.5
44.	AU-766	Construction History	25+0+5	2.0
45.	H-713	Hydraulic Regulations and Meliorations	30+30+0	5.5
46.	NK-743	Introduction to Structural Design	20+10+0	2.0
47.	AU-769	Final Works in Architecture	30+30+0	4.0
48.	P-777	Earthworks	30+15+0	4.0
49.	P-774	Railway Engineering	30+15+15	5.5

*L+E+S: lectures + exercises + seminars

3.2. DESCRIPTION OF EACH ITEM

3.2.1. Description of compulsory and elective courses

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General information		
Course leader	Assoc. Prof. Iva Mrak, Ph.D	
Course	ARCHITECTURAL STRUCTURES I	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Understanding the construction process and the characteristics of the different stages of the process. Knowledge and understanding of the elements of structures and the ability to connect the basic elements into constructive units. Knowledge of materials and technologies and knowledge of choosing possible technologies to solve a given engineering problem. Making drawings of correct details of structures.

1.2. Conditions for enrolment in courses

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1.3. Expected learning outcomes for the subject

1. List the phases of the construction process, participants in the construction and their roles.
2. Explain the phases in design, the roles of participants in construction, the basic goals of construction organization, basic machinery and auxiliary structures in construction.
3. Explain the basic building materials and the most common constructions in the construction of buildings.
4. Explain constructions and their constructive, functional and technological characteristics and modern ways of execution.
5. Use data from manufacturers of construction products
6. To provide concrete and usable engineering solutions using modern materials and technologies present on the market.
7. Recognize the characteristics of basic materials and technologies in construction and their roles.
8. Create blueprints that allow for actual execution.

1.4. Content of the course

1. Basics of the construction process (project assignment, design, projects, participants in construction, basics of construction organization).
2. Basic types of architectural structures with regard to the selected materials and construction system: foundation, waterproofing and thermal insulation, walls made of stone, brick, concrete, aerated concrete, complex, mezzanine structures - prefabricated, semi-prefabricated, monolithic, wooden, flat roofs.
3. Selection of construction, materials and technologies with regard to the requirements and place of installation.
4. The influence of the choice of structures, materials and technologies on the requirements for buildings.
5. Details of basic architectural structures from the foundation to the roof.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☒ Independent tasks ☒ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Compulsory attendance at classes, active classes, checks, development and colloquial programming. Final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity	0,5	Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task	1,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums and programs (70%), exam (30%).

1.10. Compulsory literature

1. Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997
2. Peulić, Đ., Constructive Elements of Buildings, Croatia knjiga, Zagreb, 2002.
3. Sorić, Z.: Masonry Structures I, Croatian Association of Civil Engineers, Zagreb, 1999.
4. Crnković, B., Šarić, Lj., Construction with Natural Stone, IGH, 2003.
5. Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.
6. Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.

1.11. Supplement literature

1. Francis D. K. Ching, Building Construction Illustrated, Wiley, New Jersey, USA, 2014.
2. Andrea Deplazes (eds), Constructing Architecture: Materials, Processes, Structures: a Handbook, Darch Eth, 2008.
3. Torricelli, M.C., Del Nord, R., Felli, P., Materials and technologies of architecture, Editori Laterza, 2012.
4. Neufert: Elements of Architectural Design, Golden Marketing, Zagreb 2002
5. Quaderni del Manuale di progettazione edilizia, Hoepli, 2006.
6. Ripamonti, M.E., Dolce, F.C., Thermal bridges, analysis and solution hypotheses. Dario Flaccovio, 2011.
7. Rex, S. Industrial Way of Construction I and II, IGH Faculty of Civil Engineering, Zagreb, 1983.
8. Technology of Wooden Buildings, Mozaik knjiga, 2001.
9. Buđevac, D., Metal Structures in Buildings, Construction Book, 2000.
10. Production programs of construction products.
11. Additional literature according to the topics of lectures recommended during classes.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997	1 (13 vols.)	75
Peulić, Đ., Constructive Elements of Buildings, Croatia knjiga, Zagreb, 2002.	19	
Sorić, Z.: Masonry Structures I, Croatian Association of Civil Engineers, Zagreb, 1999.	21	
Crnković, B., Šarić, Lj., Construction with Natural Stone, IGH, 2003.	4	
Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.	6	
Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.	3	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Iva Mrak, Ph.D	
Course	ARCHITECTURAL STRUCTURES II	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Knowledge and understanding of the elements of structures and the ability to connect the basic elements into constructive units. Knowledge of materials and technologies and knowledge of choosing possible technologies to solve a given engineering problem. Making drawings of correct details of structures.

1.2. Conditions for enrolment in courses

Architectural Structures I - passed

1.3. Expected learning outcomes for the subject

1. Recognize more complex structures (roofing, wooden structures, steel structures).
2. Explain the constructive, functional and technological characteristics and modern ways of performing more complex structures (roofing, wooden structures, steel structures).
3. Use data from manufacturers of construction products.
4. Provide concrete and usable engineering solutions using modern materials and technologies present on the market.
5. Recognize the characteristics of materials and technologies in construction and their roles.
6. Use the data of the manufacturer of construction products.
7. Create blueprints that allow for actual execution.

1.4. Content of the course

1. More demanding types of architectural constructions with regard to the selected materials and construction system:
   - wooden and steel structures and roofing,
   - spatial systems, shells, vaults and domes,
   -Staircases
   - facades,
   - Acoustic, insolation and fire protection
   - Basic finishing works in construction
2. Selection of construction, materials and technologies with regard to the requirements and place of installation.
3. Details of more demanding architectural constructions from the foundation to the roof.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☒ Independent tasks ☒ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____

1.6. Comments	

1.7. Obligations of students

Compulsory attendance at classes, active classes, checks, development and colloquial programming. Final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task	1	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums and programs (70%), exam (30%).

1.10. Compulsory literature

1. Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997
2. Peulić, Đ., Constructive Elements of Buildings, Croatia knjiga, Zagreb, 2002.
3. Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.
4. Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.

1.11. Supplement literature

1. Francis D. K. Ching, Building Construction Illustrated, Wiley, New Jersey, USA, 2014.
2. Andrea Deplazes (eds), Constructing Architecture: Materials, Processes, Structures: a Handbook, Darch Eth, 2008.
3. Torricelli, M.C., Del Nord, R., Felli, P., Materials and technologies of architecture, Editori Laterza, 2012.
4. Sorić, Z.: Masonry Structures I, Croatian Association of Civil Engineers, Zagreb, 1999.
5. Crnković, B., Šarić, Lj., Construction with Natural Stone, IGH, 2003.
6. Rex, S. Industrial Way of Construction I and II, IGH Faculty of Civil Engineering, Zagreb, 1983.
7. Technology of Wooden Buildings, Mozaik knjiga, 2001.
8. Ilić, S.N., Classic Wooden Roofs. Attic, Construction Book, Belgrade, 2003.
9. Buđevac, D., Metal Structures in Buildings, Construction Book, 2000.
10. Neufert: Elements of Architectural Design, Golden Marketing, Zagreb 2002
11. Quaderni del Manuale di progettazione edilizia, Hoepli, 2006.
12. Ripamonti, M.E., Dolce, F.C., Thermal bridges, analysis and solution hypotheses. Dario Flaccovio, 2011.
13. Production programs of construction products.
14. Additional literature according to the topics of lectures recommended during classes.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997	1 (13 vols.)	75
Peulić, Đ., Constructive Elements of Buildings, Croatia knjiga, Zagreb, 2002.	19	
Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.	6	
Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.	3	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Asst. Prof. Marijana Cuculić, Ph.D	
Course	INTRODUCTION TO ROAD DESIGN	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The student is trained to participate in the development of the road project. He is familiar with the basic elements of the road outside the settlement.

1.2. Conditions for enrolment in courses

Geodesy - passed

1.3. Expected learning outcomes for the subject

1. Plan and rank roads according to their position in the road network, social and economic importance, type and size of traffic, and connection tasks.
2. Assess the degree of restriction of the terrain through which the road should pass or passes and identify conflict zones of the road with the environment and other interventions in the area.
3. Create a road design (floor plan elements and elements of longitudinal and cross-section) according to the applicable regulations.
4. Create a road project taking into account traffic safety (stop visibility (horizontal, vertical and overtaking), relevant speed).
5. Calculate the road elements required for stakeout.
6. Define the specifics of traffic flow on out-of-town roads.

1.4. Content of the course

- Introduction, Division and Road Regulations
- Making a road project
- Cross-section of the road with elements
- Basics of horizontal guidance of the road line
- Basics of vertical and spatial line guidance
- Road equipment and signage
- Cross-sectional details
- Calculation of flexible pavement structure according to applicable standards
- Materials for the construction of pavement structures
- Road drainage facilities

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☒ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____

1.6. Comments	

1.7. Obligations of students

- Creating a program task
- Written examinations

1.8. Monitoring student work

Attending classes	2,0	Teaching activity		Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task	1,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

70% during classes, 30% at the final exam.

1.10. Compulsory literature

1. Ordinance on the basic conditions that public roads outside settlements and their elements must meet from the point of view of traffic safety
2. Dragčević, V.; Korlaet Ž.: Basics of Road Design, Zagreb, 2003.
3. Korlaet, Ž.: Road Design and Construction, Zagreb 2018.
4. Lukić, Č.D.; Anagnosti, P.V.: Geotehnika saobraćajnica; Beograd 2010.
5. General technical conditions for road works; Zagreb 2001.

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Ordinance on the basic conditions that public roads outside settlements and their elements must meet from the point of view of traffic safety,	Available online	75
Korlaet, Ž.: Road Design and Construction, Zagreb 2018.	3	
Dragčević, V.; Korlaet Ž.: Basics of Road Design, Zagreb, 2003.	10	
Lukić, Č.D.; Anagnosti, P.V.: Geotehnika saobraćajnica; Beograd 2010.	5	
General technical conditions for road works; Zagreb 2001	Available online	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Adriana Bjelanović, Ph.D	
Course	TIMBER STRUCTURES	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	36+24+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Acquisition of theoretical and professional skills on the application of wood and wood materials and products in construction, calculation methodology and the basics of designing wooden structures. Acquisition of basic professional competencies in project development and execution of wooden structures of simpler static systems and limited spans. The basis for further education in the field of wooden structures and construction in general.

1.2. Conditions for enrolment in courses

Technical Mechanics I and Technical Mechanics II – passed

1.3. Expected learning outcomes for the subject

1. Application of basic knowledge acquired in theoretical courses and their connection with professional topics in courses.
2. Understanding and application of topics from the course area (lectures and auditory exercises):
3. Development of a program at the level of a conceptual design of a simple and typical construction of a limited range – application and synthesis of basic theoretical and professional topics of the course.
4. Understanding the specifics of the design and construction of wooden structures from the point of view of disposition, calculation basics (types of wooden material and dimensions, basics of calculation methodology), ensuring spatial stability, protection, design of characteristic details and execution procedures.
5. Developing the ability to perceive and understand the transmission of forces in structures from the point of view of the function of structural elements and to recognize details characteristic of wooden structures

1.4. Content of the course

- General overview of timber structures: development of modern systems, application, design methodology.
- Wood as a material – properties and the influence of properties on design
- Wood materials and products: overview of sheet and panel materials and products, application, classification according to strength.
- Basics on durability and fire resistance
- Calculation of limit states of timber structure elements
- Connection Techniques and Connection Design in Timber Structures (Compulsory Systems and Simple Type Frames)
- Calculation of boundary states of compounds. Staples in wooden structures.
- Traditional and Contemporary Fittings: Design, Basics of Force Transmission
- Classic and contemporary wooden roofing: load-bearing systems and shaping characteristic details.

- Lattice systems: principles of lattice beam design, calculation of elements and connections, connection design.
- Basics on the spatial stability of simple wooden structures.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Preparation of the program task (preliminary or abbreviated main design of a standard wooden structure of standard complexity, passing partial exams (colloquiums) and the final exam. Attendance at classes in accordance with the Study Regulations.

1.8. Monitoring student work

Attending classes	2,0	Teaching activity		Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,25	Report		Practical work	
Portfolio		Program task	1,75	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

70% during classes, 30% on the exam according to the current Ordinance on Studies of the University of Rijeka and the Ordinance on the Evaluation and Evaluation of the Work of Students at the Faculty of Civil Engineering of the University of Rijeka.

1.10. Compulsory literature

1. Bjelanović, Adriana; Rajčić, Vlatka: WOODEN CONSTRUCTIONS according to European Standards, (university textbook, reissued by Croatian University Press, Faculty of Civil Engineering, University of Zagreb), Zagreb, 2007 (ISBN 978-953-169-115-4); Electronic edition 2020 (repository of the GF Library in Rijeka, GF in Zagreb)

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
WOODEN STRUCTURES according to European standards	12 / online	75

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Asst. Prof. Ksenija Tijanić Štrok, Ph.D	
Course	CONSTRUCTION ECONOMICS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The goal is to acquire the knowledge necessary for cost analysis and calculations of construction works.

1.2. Conditions for enrolment in courses

Construction Management - passed

1.3. Expected learning outcomes for the subject

1. Define, describe and present basic economic concepts in construction production and business processes and systems.
2. Interpret basic and specific concepts from the economics of construction.
3. Elaborate in writing and orally a problem in the field of construction economics using appropriate terminology.
4. To make a complete offer for the construction of a medium-complex building or high-rise building.

1.4. Content of the course

1. Norms in construction.
2. Norms of construction works – preparatory, earthwork, carpentry, reinforcement, concrete, masonry, transmissions, craftsmanship.
3. Standardization of machine work.
4. Cost structure in construction - material costs, labor costs, machine labor costs, machine labor costs, machine depreciation, direct and indirect costs, structure of indirect costs on the construction site, company management costs, additional calculation, calculation factor, price analysis, construction work price calculations.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

70% attendance at exercises. 70% of attendance at lectures. Program.

1.8. Monitoring student work

Attending classes	2,0	Teaching activity		Seminar paper		Experimental work	
Written exam	1,0	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,0	Report		Practical work	
Portfolio		Program task	1,0	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums and program assignment (70%), exam (30%).

1.10. Compulsory literature

1. Lecture and exercises on the Merlin system
2. Katavić, M., Basics of Economics for Builders, Croatian University Press, Croatian Association for Construction Organization, Zagreb, 2009.
3. Bučar, G., Norms and Prices in Construction, ICG d.o.o., Omišalj, Faculty of Civil Engineering in Rijeka, Rijeka, 2003.
4. Norms and Standards of Work in Construction, Construction Book, Belgrade, Belgrade 2001.
5. Standard Calculation of Works in Building Construction, Bulletin, Institut IGH, d.d., Zagreb

1.11. Supplement literature

1. Linarić, Z. Construction Machinery; Machine labor costs
https/www.grad.unizg.hr/_download/repository/troskovistrojnograda.pdf

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Katavić, M., Basics of Economics for Builders, Croatian University Press, Croatian Association for Construction Organization, Zagreb, 2009.	7	75
Bučar, G., Norms and Prices in Construction, ICG d.o.o., Omišalj, Faculty of Civil Engineering in Rijeka, Rijeka, 2003.	10	
Norms and Standards of Work in Construction, Construction Book, Belgrade, Belgrade 2001.	1 set	
Standard Calculation of Works in Building Construction, Bulletin, Institut IGH, d.d., Zagreb	Merlin System	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Boris Podobnik, Ph.D	
Course	PHYSICS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+15+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The goal is to instruct students in the basic laws of physics, where knowledge of computer use will also be required.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Define basic physical quantities and units of measurement.
2. Define the causes of motion and relationships in space and time.
3. Describe the causes of gas pressure and thermal processes.
4. Learn the basic elements of design and development of preliminary and detailed designs.
5. Understanding the programs created.

1.4. Content of the course

The concept of space and time. Fundamental forces in nature. Mechanical oscillation. Harmonic, muffled and forced flickering. Internal energy and heat. Laws of thermodynamics. Superficial phenomena. Capillarity. Portable phenomena. Diffusion, thermal conductivity. Elastic waves. Sound. Deformation of the body. Elastic and plastic properties. Hooke's Law. Torsion. Intermolecular forces.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

In addition to attending classes, students are expected to take colloquiums and final exams.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper		Experimental work	
Written exam	1,25	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,25	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums, assignments (70%), exam (30%).

1.10. Compulsory literature

1. Kilić, S.: Physics I, Faculty of Civil Engineering in Split, 1986.
2. Cindro, N.: Physics II, Školska knjiga, Zagreb, 1984.

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Kilić, S.: Physics I, Faculty of Civil Engineering in Split, 1986.	5	75
Cindro, N.: Physics II, Školska knjiga, Zagreb, 1984.	5	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Andrej Marinović, lecturer	
Course	GEODESY	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+15+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Adoption and understanding of basic concepts and terminology in the field of geodesy.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Define basic concepts in geodesy.
2. Explain and calculate basic levelling quantities.
3. Describe the mode of operation and use of geodetic instruments.
4. Define and explain the concept of leveling and describe the types of leveling.
5. Define and explain photogrammetry.
6. Calculate the basic elements of staking (vertical and horizontal).

1.4. Content of the course

Basic concepts of geodesy.
Level.Lengths.Angles.Positioning.Control measurements. Satellite positioning.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at exercises and lectures. Creating a program within the framework of exercises. Passing the colloquium and final exam.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper		Experimental work	
Written exam	0,75	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,75	Report		Practical work	
Portfolio		Program task	1	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums, programs (70%), final exam (30%).

1.10. Compulsory literature

1. Macarol, S.: Practical Geodesy, Technical Book, Zagreb,
2. Pribičević B., Medak D.: Geodesy in Civil Engineering, V.B.Z. d.o.o. Zagreb 2003.

1.11. Supplement literature

1. Janković, M.: Engineering Geodesy I and II
2. Kapetanović N., Selesković F.: Geodesy, University Book, Sarajevo
3. Schofield W.: Engineering surveying, Butterworth Heinemann 2001.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Macarol, S.: Practical Geodesy, Tehnička knjiga, Zagreb	1	75
Pribičević B., Medak D.: Geodesy in Civil Engineering, V.B.Z. d.o.o. Zagreb 2003.	15	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Maura Jurić, senior lecturer	
Course	GEOMETRIC GRAPHICS I	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	3,5
	Number of hours (L+E+S)	15+0+30

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

- Develop the ability of spatial perception
- Acquire knowledge of Descriptive Geometry as the basis of engineering graphic communication
- Acquire the skills needed to solve 3D problems, using CAD
- To get to know the geometric laws as well as the constructive methods necessary for solving spatial problems.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. The student will be able to constructively solve metric and positional problems: point, line and plane relations.
2. They will develop their ability to spatially imagine.
3. They will be able to apply the constructions of the ellipse.
4. They will be able to draw orthogonal projections of geometric solids (objects).
5. It will use simple CAD - modelling in virtual 3D space.
6. Students will be able to depict geometric solids in axonometry and sketch objects.

1.4. Content of the course

Graphic engineering communication. Descriptive geometry as an information technology and its fundamental mechanisms of communication.
Monge projection and metric problems. Application in CAD
Prospective affinity. Constructions of the ellipse.
Prospective collination. The theory of conics - parabola and hyperbola. Curves in CAD.
Rotation. Character projection.
Geometric solids and their CAD models.
Axonometry. Application in CAD.

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

- Regular attendance of complete classes
- Active solving and referencing of given problems in the form of seminars, using CAD.
- All papers must be completed and positively evaluated during the semester.
- A certain number of points must be collected to sign. Repeaters are required to attend the course and earn a signature by scoring points and not by passive presence.
- Program development
- Passing the final exam

1.8. Monitoring student work

Attending classes	1,5	Teaching activity	0,5	Seminar paper	0,5	Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment		Report		Practical work	
Portfolio		Program task	0,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Seminar paper, presentation of the seminar paper, program assignment, colloquia (70%), written and oral exam (30%).

1.10. Compulsory literature

1. Pletenac, Lidija: Constructive Geometry in CAD, electronic textbook-script
2. Niče, dr. Vilko: Descriptive Geometry I and II, Školska knjiga, Zagreb, 1992.
3. Babić; Gorjanc; Sliepčević; Szirovicza: Constructive Geometry, IGH, Zagreb, 2000.
4. The website http://master.grad.hr/nastava/geometrija/
5. http://gradri.hr/~pletenac/

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Niče, dr. Vilko: Descriptive Geometry I, Školska knjiga, Zagreb, 1992.	2	
Niče, dr. Vilko: Descriptive Geometry II, Školska knjiga, Zagreb, 1992.	5	
Babić; Gorjanc; Sliepčević; Szirovicza: Constructive Geometry, IGH, Zagreb, 2000.	6	
The website http://master.grad.hr/nastava/geometrija/	Available online	
http://gradri.hr/~pletenac/	Available online	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Maura Jurić, senior lecturer	
Course	GEOMETRIC GRAPHICS II	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	3,5
	Number of hours (L+E+S)	15+0+15

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

- Develop the ability of spatial perception
- Acquire knowledge of Descriptive Geometry as the basis of engineering graphic communication
- Acquire the skills needed to solve 3D problems, using CAD
- To get to know the geometric laws as well as the constructive methods necessary for solving spatial problems.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Students are introduced to the new material. The ability to observe, to draw conclusions, develops. The horizons are expanding.
2. Students practiced applying the acquired knowledge to solve tasks.
3. Knowledge of the law, ability to apply to the task.
4. Creative application of knowledge.
5. Mastering methods of solving new problems.
6. Graphical representation by computer and hand.
7. Completing knowledge and completing papers, the Internet, learning to work with software...

1.4. Content of the course

Cross-sections of geometric solids by plane and solution in CAD
Touch plane and normal of the cone, cylinder and sphere.
Piercings.
Quoted projection. Topographic surfaces. Solving the situation of earthworks with drainage. Contour and transverse profile method. Longitudinal profile. Demonstration of the application of professional software.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

- Regular attendance of complete classes
- Active solving and referencing of given problems in the form of seminars, using CAD.
- All papers must be completed and positively evaluated during the semester.
- A certain number of points must be collected to sign. Repeaters are required to attend the course and earn a signature by scoring points and not by passive presence.
- Passing the final exam

1.8. Monitoring student work

Attending classes	1	Teaching activity	0,5	Seminar paper	0,5	Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment		Report		Practical work	
Portfolio		Program task	1	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Program, colloquia (70%), final exam (30%)

1.10. Compulsory literature

1. Pletenac, Lidija: Constructive Geometry in CAD, electronic textbook-script
2. Niče, dr. Vilko: Descriptive Geometry I and II, Školska knjiga, Zagreb, 1992.
3. Babić; Gorjanc; Sliepčević; Szirovicza: Constructive Geometry, IGH, Zagreb, 2000.
4. The website http://master.grad.hr/nastava/geometrija/
5. http://gradri.hr/~pletenac/

1.11. Supplement literature

1. Brauner, Kickinger: Geometry in Construction, Školska knjiga, Zagreb, 1980 (translated by Kurilj, Hajsig)
2. Giering, Dr. Osvald; Seybold, Dr. Hans: Constructive Engineering Geometry, Carl Hanser Verlag, Munich, Vienna, 1987.
3. Hohenberg, Fritz: Constructive Geometry in Technology, Vienna, 1961.
4. Pal, Imre: Descriptive Geometry in Anaglyphic Images, Tehnička knjiga, Zagreb, 1966 (translated by Dr. Niče)
5. DesignCAD Manual (on-line)

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Pletenac, Lidija: Constructive Geometry in CAD, electronic textbook-script	0	75
Niče, dr. Vilko: Descriptive Geometry I, Školska knjiga, Zagreb, 1992.	2	
Niče, dr. Vilko: Descriptive Geometry II, Školska knjiga, Zagreb, 1992.	5	
Babić; Gorjanc; Sliepčević; Szirovicza: Constructive Geometry, IGH, Zagreb, 2000.	6	
The website http://master.grad.hr/nastava/geometrija/	Available online	
http://gradri.hr/~pletenac/	Available online	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Sanja Dugonjić Jovančević, Ph.D	
Course	GEOTECHNICAL ENGINEERING	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4,5
	Number of hours (L+E+S)	30+20+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Bringing geotechnical engineering closer to students, by providing essential knowledge about the formation of soil and rock materials, as well as knowledge about the behavior of soil and rock materials in foundation and supporting structures, and objects made of soil.

1. Define peculiarities and classify soil and rock mass.
2. List the basic methods of soil and rock mass testing in the field and in the laboratory.
3. Describe the influence of water in the soil and explain the principle of water flow in the soil and rock mass.
4. Define the principle of soil strength and rock mass.
5. Define the principle of the relationship between states of stress and deformation in soil and rock mass.
6. Describe the process of consolidation in the soil.
7. Define the basic principles of strength criteria and the relationship between stress and strain states in the soil
   due to the action of geotechnical structures
8. Define the basics of slope stability and observations in geotechnics
9. Solve problem tasks in the field of physico-mechanical properties of the soil, water flow in the soil, stresses and deformations in the soil, calculate the actual and permissible stresses on sub-shallow foundations, solve the problem of soil thrust.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Enumerate and distinguish the basic physical, mechanical and hydraulic properties of soil and rock mass.
2. Classify and identify different soil types and rock masses.
3. List and compare the basic methods of field and laboratory research in geotechnical engineering.
4. Predict the flow regime of water in the soil and rock mass and its impact on their formation.
5. Understand the relationships between stress, deformation and strength of soil and rock mass.
6. To list the basic geotechnical constructions and interventions in the soil and rock mass.
7. Understand possible failure mechanisms and calculate load-bearing capacity and subsidence under shallow foundations.
8. Calculate the load capacity of piles according to the given conditions and geometry of the problem.
9. Define the thrusts that occur in the soil and calculate the supporting structure.
10. Define problems related to slope stability and list possible stabilization solutions.

1.4. Content of the course

Physical, mechanical and hydraulic properties of soil and rock
Classifications and Identifications of Soil and Rock
Field and laboratory tests of soil and rock
Water in soil and rock
Relationship of stress and deformation in soil
Soil and rock mass strength
Bearing capacity and subsidence of shallow foundations and piles
Thrusts in the ground and retaining structures
Slope Stability and Observation in Geotechnical Engineering

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending lectures and exercises. Independent activities during classes. Taking the exam.

1.8. Monitoring student work

Attending classes	1,7	Teaching activity		Seminar paper		Experimental work	
Written exam	1,2	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,6	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums, seminar (70%), exam (30%).

1.10. Compulsory literature

1. Nonveiller, E.: Soil Mechanics and Building Foundations, Školska knjiga, Zagreb, p.780, 1979.

1.11. Supplement literature

1. Bowles, J.E.: Foundation analysis and design, Mc. Graw Hill, III. Ed. Int. Student ed., New York, p 816, 1986.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Nonveiller, E.: Soil Mechanics and Building Foundations, Školska knjiga, Zagreb, p.780, 1979.	6	75

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Ivan Marović, Ph.D	
Course	CIVIL ENGINEERING REGULATIONS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	2
	Number of hours (L+E+S)	30+0+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

It is necessary for students of future civil engineers to master the basic concepts, categories, institutes and legal relations in construction in a broad sense.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Interpret the basic legal concepts.
2. Interpret specific concepts of building regulations
3. Apply the adopted terms in the interpretation of legal problems in construction
4. Make appropriate use of the available applicable technical regulations

1.4. Content of the course

Introduction to Law: Concepts, Categories, Institutes, Legal Relations.
Construction regulations.
Companies in the building materials industry, in design and construction.
attitude towards the state.
Procedures. Surveillance. Inspection.
Individual legal acts.
Court proceedings.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Colloquium, taking exams.

1.8. Monitoring student work

Attending classes	1,0	Teaching activity		Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums (70%), exam (30%).

1.10. Compulsory literature

1. Construction Act, Official Gazette 153/13, 20/17, 39/19, 125/19.
2. Physical Planning Act, OG 153/13, 65/17, 114/18, 39/19, 98/19.
3. Act on Physical Planning and Construction Activities and Activities, Official Gazette 78/15, 118/18, 110/19.
4. Occupational Safety and Health Act, Official Gazette 71/14, 118/14, 154/14, 94/18, 96/18.
5. Civil Obligations Act, OG 35/05, 41/08, 125/11, 78/15, 29/18, 126/21
6. Special Customs on Construction, Official Gazette 137/21

1.11. Supplement literature

1. FIDIC: Conditions of Contract for Construction, FIDIC, Geneva, 1999.
2. FIDIC: Conditions of Contract for Plant and Design Build, FIDIC, Geneva, 1999.
3. FIDIC: Conditions of Contract for EPC/Turnkey Projects, FIDIC, Geneva, 1999.
4. Rajčić, D., Nikšić, S.: Introduction to Construction Law, Croatian University Publishing and Zagora-Zagorje, Zagreb, 2008.
5. Vukmir, B.: Contracts on Construction and Services of Consulting Engineers, RRIF-Plus, Zagreb, 2009.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Official Gazette: https://narodne-novine.nn.hr/	Available online	75

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Silvija Mrakovčić, Ph.D; Assoc. Prof. Natalija Bede Odorčić, Ph.D	
Course	CIVIL ENGINEERING MATERIALS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The aim of the course is to familiarize students with the properties, testing methods, standards and production technologies of construction materials.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Argue orally about the properties and application of building materials and analyze the possibilities of using certain building materials.
2. Examine and record the physical and mechanical properties of building materials.
3. To calculate and interpret the physical and mechanical properties of construction materials.
4. To apply the acquired knowledge about the ingredients and technology of concrete and to design the composition of concrete of the given strength, workability and durability.
5. Distinguish the properties of building materials, production and construction technologies and judge the possibilities of application.

1.4. Content of the course

Physical, mechanical and technological properties of materials. Properties, production, application and testing of properties of building materials: stone, wood, ceramic materials, inorganic binders, concrete, organic binders, asphalt, metals, polymers and polymeric materials, glass.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☒ Independent tasks ☐ Multimedia & Network ☒ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Students are required to regularly attend lectures and exercises, take colloquiums, actively participate in laboratory and computational exercises, pass the final exam.

1.8. Monitoring student work

Attending classes	2,0	Teaching activity		Seminar paper		Experimental work	0,7
Written exam	0,9	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,4	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Periodic examination of knowledge (colloquia), laboratory and auditory exercises (70%), final exam (30%).

1.10. Compulsory literature

1. Ukrainczyk V: Poznavanje gradiva, Institut građevinarstva Hrvatske, Alcor, Zagreb, 2001.
2. Ukrainczyk, V.: Beton – struktura, svojstva, tehnologija, Alcor, Zagreb, 1994.
3. Bjegović, D., Štirmer, N.: Teorija i tehnologija betona Mjerne metode, Zagreb, 2022.
4. Bjegović D., Balabanić G., Mikulić D.: Građevinski materijali – zbirka riješenih zadataka, Zagreb, 2007.

1.11. Supplement literature

1. Mamlouk, M.S., Zaniewski, J.P.: Materials for civil and construction engineers, Pearson Education Limited, Essex, 2018.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Ukrainczyk V: Poznavanje gradiva, Institut građevinarstva Hrvatske, Alcor, Zagreb, 2001.	8	75
Ukrainczyk, V.: Beton – struktura, svojstva, tehnologija, Alcor, Zagreb, 1994.	10	75
Bjegović, D., Štirmer, N.: Teorija i tehnologija betona Mjerne metode, Zagreb, 2022	5	75
Bjegović D., Balabanić G., Mikulić D.: Građevinski materijali – zbirka riješenih zadataka, Zagreb, 2007.	22	75

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Neira Torić Malić, Ph.D	
Course	ENGINEERING INFORMATICS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	3,5
	Number of hours (L+E+S)	15+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

To give a systematic overview of some basic areas of informatics and computing, the student acquires the ability to independently use computers and computer networks in solving engineering problems

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Distinguish the role and use of operating systems.
2. Work on computers in a network environment.
3. Set up and fix the problem in Excel.
4. Set up and fix a problem in Mathcad.
5. Analyze the data collected through the network and extract key information.
6. Organization of teamwork, creation of a computer presentation.
7. Acquisition of presentation skills.

1.4. Content of the course

- History of computers and overview of past developments
- Computer structure
- Operating systems – definition, basic functions, comparison of operating systems, work in the network,
- Computer Communications and Network Services – Local Area Networks, Global Networks, Internet
- Universal tools in the Windows environment (word processor, spreadsheet, presentation software)
- Programming and programming languages - machine languages, assemblers and higher programming languages, program translators, algorithm concept, graphical representation of an algorithm, preparation of problems for computer processing, program documentation, mathematical modeling, HTML, Java
- Engineering packages (basics of working with mathematical calculations)
- Application of computers in the field of construction: current state and trends
- Exercises: Practical work on computers. During the exercises, examples related to lectures are made individually.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____

1.6. Comments	

1.7. Obligations of students

- Attendance at classes
- Periodic examinations
- Final exam

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,5	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

70% during classes, 30% final exam

1.10. Compulsory literature

1. Lecture materials presented on the course website
2. Addresses of relevant websites offered on the course website
3. Books related directly to the software presented in the exercises - the literature is updated every year

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Lecture materials presented on the course website	Available online	75
Addresses of relevant websites offered on the course website	Available online	
Books related directly to the software presented in the exercises - the literature is updated every year	-	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Anamarija Perušić Pribanić, Ph.D	
Course	MATHEMATICS I	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	6,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The student is introduced to the basics of mathematical logic, set theory and vectors. The student acquires basic knowledge of mathematical analysis. Develops the ability to recognize and solve tasks related to the teaching content. It represents the basis for successful mastering of other subjects.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Students will be introduced to the basics of mathematical logic, set theory, and vectors.
2. Students will acquire basic knowledge of mathematical analysis.
3. Students will develop the ability to recognize and solve tasks related to the teaching content.
4. Students will acquire the prior knowledge they need to successfully master other courses.

1.4. Content of the course

Basic concepts about sets.
Sets of numbers.
Vectors in plane and space.
Functions, Limits, and Arrays.
Derivatives.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at lectures and exercises. Colloquiums, final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity	0,5	Seminar paper		Experimental work	
Written exam	1,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	2,5	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Exercises, colloquia (70%), final exam (30%).

1.10. Compulsory literature

1. Štambuk, Ljubica: Mathematics I, University of Rijeka, Faculty of Engineering, Rijeka, 2002.
2. Ilijašević, Milan: Methodical Collection of Tasks, Zagreb, 1976.
3. Stein, Sherman K.; Barcellos, Anthony: Calculus, McGraw-Hill, New York, 1992.

1.11. Supplement literature

1. Javor, Petar: Introduction to Mathematical Analysis, Školska knjiga, Zagreb, 1993.
2. Javor, Petar: Mathematical Analysis - a Collection of Tasks, Školska knjiga, Zagreb, 1994.
3. Demidovič, B.P.: Tasks and Solved Examples from Higher Mathematics, Tehnička knjiga, Zagreb, 1992.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Štambuk, Ljubica: Mathematics I, University of Rijeka, Faculty of Engineering, Rijeka, 2002.	5	75
Ilijašević, Milan: Methodical Collection of Tasks, Zagreb, 1976.	1	
Stein, Sherman K.; Barcellos, Anthony: Calculus, McGraw-Hill, New York, 1992.	2	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Anamarija Perušić Pribanić, Ph.D	
Course	MATHEMATICS II	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	5
	Number of hours (L+E+S)	30+15+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The student is introduced to the basics of matrix calculus and solving determinants. The student acquires basic knowledge of mathematical analysis. Develops the ability to recognize and solve the tasks of the Integral Calculus and its application. It represents the basis for successful mastering of other subjects.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Define and correctly interpret the basic concepts of linear algebra (matrices, operations with matrices, determinants, rank and inverse of a matrix; vector space), a system of linear equations and the concept of an indefinite integral and a definite integral.
2. Perform basic computational operations with determinants, matrices.
3. Perform some methods of approximate calculation of a certain integral.
4. To find solutions to arbitrary linear systems.
5. Calculate by applying the integral calculus of some area and volume.

1.4. Content of the course

Introduction to Matrix Calculus.
Determinant.
Neodređeni integral.
A definite integral.
A specific integral.
Application of derivatives.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance, program development, colloquia, final exam.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity	0,5	Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,5	Report		Practical work	
Portfolio		Program task	0,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Exercises, colloquia (70%), final exam (30%)

1.10. Compulsory literature

1. Javor, Petar: Introduction to Mathematical Analysis, Školska knjiga, Zagreb, 1992.
2. Javor, Petar: Mathematical Analysis - a Collection of Tasks, Školska knjiga, Zagreb, 1994.
3. Stein, Sherman K.; Barcellos, Anthony: Calculus, McGraw-Hill, New York, 1992.

1.11. Supplement literature

1. Ilijašević, Milan: Methodical Collection of Tasks, Tehnička knjiga, Zagreb, 1976.
2. Demidovič, B.P.: Tasks and Solved Examples from Higher Mathematics, Tehnička knjiga, Zagreb, 1992.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Javor, Petar: Introduction to Mathematical Analysis, Školska knjiga, Zagreb, 1992.	22	75
Javor, Petar: Mathematical Analysis - a Collection of Tasks, Školska knjiga, Zagreb, 1994.	15	
Stein, Sherman K.; Barcellos, Anthony: Calculus, McGraw-Hill, New York, 1992.	2	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Ivan Marović, Ph.D	
Course	CONSTRUCTION MANAGEMENT	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	6,5
	Number of hours (L+E+S)	45+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Acquisition of organizational knowledge and skills necessary for organizing the preparation and planning of the construction of the facility, as well as the management and management of the construction itself.

1.2. Conditions for enrolment in courses

Construction Technology – Enrolled

1.3. Expected learning outcomes for the subject

1. Interpret the basic concepts of organization and construction technology.
2. Analyze and apply methods of estimating construction time and evaluate the final construction period.
3. Choose and apply methods of standardization of work in construction.
4. Devise a plan for monitoring and controlling construction.
5. Analyze and evaluate existing organizational and information models in the construction project.
6. Develop a project of organization and construction technology for a medium-complex building (civil engineering or building construction).

1.4. Content of the course

1. Introduction to the organization of construction.
2. The use of construction machinery and the calculation of effects.
3. System and project.
4. Basics of construction project management.
5. Designing the organization and technology of construction.
6. Use of construction machinery, calculation of the effects of construction machinery
7. Organization of construction processes.
8. Organization of the construction site.
9. Construction planning.
10. Organization of participants in the construction process.
11. Safety at work.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at lectures 70% and exercises 70%, positively evaluated program

1.8. Monitoring student work

Attending classes	2,5	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,75	Report		Practical work	
Portfolio		Program task	1,25	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums and program assignment (70%), exam (30%).

1.10. Compulsory literature

1. Radujković, M. et al.: Organization of Construction, University of Zagreb, Faculty of Civil Engineering, Zagreb, 2015.
2. Linarić, Z.: Lexicon of Machinery and Equipment for the Production of Building Materials - Effects of Machinery and Vehicles in Earthworks, Business Media Croatia, Zagreb, 2007.
3. Bučar, G.: Normatives of Construction Works - Handbook for Construction Entrepreneurship, ICG, Omišalj, Rijeka, 1999.

1.11. Supplement literature

1. Bučar, G.: Norms and Prices in Construction, ICG, Omišalj, Faculty of Civil Engineering in Rijeka, Rijeka, 2003.
2. Mikulić, D.: Construction Machinery: Construction, Calculation and Use, Mikulić, D., Zagreb, 1998.
3. Trbojević, B., Organization of Construction Works, Scientific Book, Belgrade, 1992.
4. Linarić, Z.: Plants for the production of bulk and related mineral materials, Business Media Croatia, Zagreb, 2009.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Radujković, M. et al.: Organization of Construction, University of Zagreb, Faculty of Civil Engineering, Zagreb, 2015.	10	75
Linarić, Z.: Lexicon of Machinery and Equipment for the Production of Building Materials - Effects of Machinery and Vehicles in Earthworks, Business Media Croatia, Zagreb, 2007.	5	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Željko Smolčić, Ph.D	
Course	BASICS OF CONCRETE AND MASONRY STRUCTURES	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Acquisition of theoretical and practical knowledge of concrete and masonry structures.

1.2. Conditions for enrolment in courses

Technical Mechanics I - passed

1.3. Expected learning outcomes for the subject

1. Size reinforced concrete rectangular and T-section section on bending.
2. To design rectangular reinforced concrete sections to centric pressure and eccentric pressure.
3. Size reinforced concrete elements to transverse forces.
4. Calculation of reinforced concrete slabs.
5. Calculated unreinforced wall (masonry, masonry) subjected to lateral load.
6. Define the properties of concrete and steel for reinforcement and explain the conditions of joint action of concrete and reinforcement.
7. Define the calculation and construction principles of basic reinforced concrete elements.

1.4. Content of the course

Basic concepts of reinforced concrete. Advantages and disadvantages of reinforced concrete.
Physico-mechanical properties of concrete and steel. Anchoring and resumption of reinforcement.
Dimensioning of reinforced concrete structures according to the limit state of load-bearing capacity.
Dimensioning of bending-stressed elements, single and double reinforced sections, rectangular and T-section beams and single-directional load-bearing plates.
Dimensioning of elements to centric and eccentric pressure.
Dimensioning of elements stressed by transverse forces.
Dimensioning elements on centric and eccentric trains.
Provisions of regulations, constructive details, budget and reinforcement plan.
Beams, columns, walls and slabs.
Basic concepts of masonry constructions. The role of bricks, mortar and reinforcement.
Unreinforced and reinforced masonry structures.
Ceilings made of reinforced brick elements and concrete.
Unreinforced concrete structures.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____

1.6. Comments	

1.7. Obligations of students

Attending lectures and exercises, creating a program, passing two colloquia and a final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,5	Report		Practical work	
Portfolio		Program task	1	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

During classes through the program and colloquium, the student acquires a maximum of 70% of the grade.
On the exam, the student acquires a maximum of 30% of the grade.
The condition for signing is the acquired 35% of the grade during classes.

1.10. Compulsory literature

1. Sorić, Z.; Kišiček, T.: Concrete Structures 1, University of Zagreb - Faculty of Civil Engineering, Zagreb, 2014.
2. Sorić, Z.; Kišiček, T.: Concrete Structures 2, University of Zagreb - Faculty of Civil Engineering, Zagreb, 2018.
3. Sorić, Z.: Masonry Structures, Zorislav Sorić, Zagreb, 2016.

1.11. Supplement literature

1. Tomičić, I..: Concrete Structures Selected Chapters, DGKH, Zagreb 1996.
2. T. I.: Concrete Constructions, Školska knjiga, Zagreb, 1996.
3. Tomičić, I.: Manual for the Calculation of Reinforced Concrete Structures, DHGK, Zagreb, 1993.
4. Concrete calendar, Belgrade, 1990. in 1991.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Sorić, Z.; Kišiček, T.: Concrete Structures 1, University of Zagreb - Faculty of Civil Engineering, Zagreb, 2014.	10	75
Sorić, Z.; Kišiček, T.: Concrete Structures 2, University of Zagreb - Faculty of Civil Engineering, Zagreb, 2018.	10	
Sorić, Z.: Masonry Constructions, Zorislav Sorić, Zagreb, 2016.	21	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Iva Mrak, Ph.D	
Course	INTRODUCTION TO DESIGN I	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Understanding the importance of construction in creating living human space. Understanding the development of construction throughout history. Understanding the phases of designing and realizing space – from spatial plan to construction. Knowledge of the approach to design housing as a basic category of construction. Development of a project for a smaller residential unit and development of a part of the detailed design using modern construction products and technologies.

1.2. Conditions for enrolment in courses

Architectural Structures I – Passed

1.3. Expected learning outcomes for the subject

1. Analyze the basic principles of design.
2. Apply the basic principles of design.
3. To create a cultural (socio-technical) basis for understanding and applying design principles.
4. List the basic characteristics of the historical development of construction, especially housing.
5. List the key people, plans and projects that defined the emergence of a modern approach to design, especially housing.
6. Indicate the stages and characteristics of the development of the plan and projects, including the role of the different actors in planning and design.
7. Distinguish the basic types of residential construction and list their characteristics, residential and urban.
8. Organize individual living spaces and one smaller housing unit.
9. Develop a conceptual design for a smaller residential unit and/or develop a part of the detailed design using modern construction products and technologies.

1.4. Content of the course

1. Elements of historical development.
2. Approach to design, from spatial plan to detailed design, site analysis, program, orientation, building physics, technical construction conditions, regulations, fire protection, at work, conservation protection.
3. Development of housing, individual and multi-dwelling. Function, construction, design.
4. Typological division of residential buildings.
5. Multi-apartment buildings.
6. Elements of the function of the apartment, horizontal and vertical layout, equipment, usable space. Function groups, living room, farm, sleeping tract, auxiliary spaces.
7. Staircases, installation guides, heating of individual buildings, common areas.
8. The choice of materials, construction and technology for the construction of residential buildings.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☒ Independent tasks ☒ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Compulsory attendance at classes (lectures and exercises). Colloquiums. Creating and circulating programs.

1.8. Monitoring student work

Attending classes	2	Teaching activity	0,25	Seminar paper		Experimental work	
Written exam	0,25	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,25	Report		Practical work	
Portfolio		Program task	1,25	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Exercises, colloquia and program (70%), exam (30%).

1.10. Compulsory literature

1. Biondić, Lj., Introduction to the design of residential buildings, Golden marketing - Technical book, 2011.
2. Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997
3. Knežević G., Kordiš I.: Residential and Public Buildings, Tehnička knjiga, Zagreb 1984.
4. Knežević, G.: Residential Buildings, Tehnička knjiga, Zagreb 1984.
5. Neufert: Elements of Architectural Design, Golden Marketing, Zagreb 2002
6. Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.
7. Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.

1.11. Supplement literature

1. Ching, F. D. K., Architecture: Form, Space, & Order, Wiley, 2014.
2. Cornoldi, A., L' architettura della casa, Officina, Milan, 1988.
3. Pleština, L., Modular (modulated) family houses, 12[2004] 2[28] SPACE
4. Pleština, L., Traditional Elements in Croatian Architecture of Family Houses during the 20th Century, 4(1996), No. 2(12) SPACE
5. Fawcett, A. P., Architecture: Design Notebook, Architectural Press, Oxford, 1998.
6. Production programs of construction products.
7. Oris magazine, Detail...
8. Additional literature according to the topics of lectures recommended during classes.
9. Other sources: www.archdaily.com, europaconcorsi.com, www.greatbuildings.com, www.oma.eu, www.rpbw.com, www.mvrdv.nl, www.miessociety.org, www.fondationlecorbusier.fr ...

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Biondić, Lj., Introduction to the design of residential buildings, Golden marketing - Technical book, 2011.	2	75
Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997	1 (13 vols.)	
Knežević G., Kordiš I.: Residential and Public Buildings, Tehnička knjiga, Zagreb 1984.	6	
Knežević, G.: Residential Buildings, Tehnička knjiga, Zagreb 1984.	5	
Neufert: Elements of Architectural Design, Golden Marketing, Zagreb 2002	13	
Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.	6	
Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.	3	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	**Bojan Bilić, senior lecturer**	
Course	**INTRODUCTION TO SPATIAL PLANNING**	
Study program	**Professional Undergraduate Study of Civil Engineering**	
Course status	**Compulsory**	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+0+15

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Introducing students to the theory and practice of urban and regional planning and standard types of spatial planning documentation (features, components, methodology of development, adoption and management), so that builders can participate in understanding and connecting construction jobs with the process of planning and space management.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Define the basic types of spatial planning documentation and their characteristics.
2. Distinguish between institutions in the process of adopting and implementing spatial plans.
3. Notice and present peculiarities and problems in space.
4. Distinguish between stages in the adoption of PP
5. List and identify the areas of regulation required for PP
6. Distinguish between zones and their characteristics and importance
7. Distinguish between types of space protection and their importance
8. Evaluate planning variants taking into account the basic criteria (e.g. criteria of polycentric development, criteria of sustainable development and other goals).

1.4. Content of the course

Basic concepts, definitions and terminology in urban planning, spatial planning and spatial planning.
Spatial and development plans: features, types, components, methodology of development, adoption and implementation. Laws, regulations and other regulations and institutions in the process of planning and implementing plans.
Geographical, functional, economic and other factors of the emergence and development of cities, structuring of urban area, types and characteristics of regions.
Analysis and planning (or protection and revitalization) of content and activities: housing, work, industry, leisure, greenery and parks, transport and other infrastructure systems, tourism, nature, cultural and historical heritage, etc. Aspects of International Spatial Planning.
Analysis and planning of spatial parts: settlement centers, residential areas, rural space.
Basic sociological, economic and ecological components of spatial planning.

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☒ Independent tasks ☒ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____

1.6. Comments	

1.7. Obligations of students

Regular participation in classes, active classes, examinations, preparation of a seminar paper.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity	0,25	Seminar paper	1,25	Experimental work	
Written exam	0,75	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,25	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Lectures, exercises, colloquia and program (70%), exam (30%).

1.10. Compulsory literature

1. Štimac, M., Spatial Planning in Practice, Gloss, 2010.
2. Ambruš, D., Mechanical City, STRAND, 2020.
3. Marinović-Uzelac, A.: Settlements, Cities and Spaces. - Zagreb: Technical Book, 1986.
4. Marinović-Uzelac, A.: Spatial Planning. - Zagreb, Home and World, 2001
5. The Physical Planning Act and subsequent bylaws. - Official Gazette of the Republic of Croatia.

1.11. Supplement literature

1. Marinović-Uzelac, A.: Socijalni prostor grada. - Zagreb: SN Liber, 1986. Meise, J., Volwahsen, A.: Urban and Regional Planning, - Wiesbaden: Vieweg & Sohn, 1980.
2. Mumford, L.: The City in History: A Translation from English. - Zagreb: Forward, 1968.
3. Marinović-Uzelac, A.: Theory of Surface Use in Urbanism. - Zagreb: Technical Book, 1989.
4. Milić, B.: The Development of Cities Through the Centuries - Part I and Di II - Zagreb, Školska knjiga, 1994.
5. Le Corbusier, Ch.-Ed.: Mindset in Urbanism. - Belgrade, Construction Book, 1974.
6. Spatial planning documentation (municipality, city, county, country, European Union).

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Štimac, M., Spatial Planning in Practice, Gloss, 2010.	16	75
Marinović-Uzelac, A.: Settlements, Cities and Spaces. - Zagreb: Technical Book, 1986.	3	
Marinović-Uzelac, A.: Spatial Planning. - Zagreb, Home and World, 2001	8	
Ambruš, D., Mechanical City, STRAND, 2020.	1	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Asst. Prof. Petra Jagodnik, Ph.D	
Course	APPLIED GEOLOGY	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	2,5
	Number of hours (L+E+S)	20+10+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Preparing students for a basic understanding of the geological structure and dynamics of the Earth as well as aspects of geology important in civil engineering. Students should be able to identify and describe common rock and soil types. The course prepares students for later courses in geotechnics, hydraulic engineering and environmental protection.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Knowledge and understanding of the role of geology in construction.
2. Knowledge and understanding of the basic principles of genetic classification of rocks. Ability to recognize basic types of igneous, sedimentary and metamorphic rocks.
3. Identification of elements of primary and secondary geological structures.
4. Understanding the process of rock weathering and soil formation.
5. Knowledge of the basic physical characteristics of the soil. Understanding the principles of engineering soil classification.
6. Understanding the course of active geomorphological processes and knowing their significance for construction.
7. Knowledge of basic methods of research of individual locations for construction purposes.

1.4. Content of the course

Origin, structure and dynamics of the Earth.
Minerals and their physical and chemical characteristics.
Eruptive, sedimentary, metamorphic rocks.
Deformation of rocks: wrinkling and faulting.
Earthquakes and seismotectonic activity.
Geological weather and stratigraphic geology.
Geological Structure of the Republic of Croatia.
Groundwater and its dynamics.
Rock decomposition and soil formation.
Classification of soils and rocks
Geomorphological processes.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending lectures and exercises. Passing the colloquium.

1.8. Monitoring student work

Attending classes	1	Teaching activity		Seminar paper		Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,5	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums (100%)

1.10. Compulsory literature

1. Teaching materials in Applied Geology; www. gradri.hr

1.11. Supplement literature

1. Šestanović, S.: Fundamentals of Engineering Geology – Application in Construction. Geoing, Split 1993.
2. Benac, Č.: Dictionary of Geological Terms, www.gradri.hr.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Teaching materials in Applied Geology	Merlin System	75

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Maura Jurić, senior lecturer	
Course	COMPUTER APPLICATIONS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	3,5
	Number of hours (L+E+S)	15+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The student is independent in the use of a tool for technical drawing on a computer, is able to recognize the problem solvable in the GIS environment and define the attribute and spatial components of the problem task, knows the basics of animation and web design.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Ability to use network resources, set up and create tasks from raster and vector graphics.
2. Application of acquired knowledge.
3. Oral expression and presentation, the ability to extract essential information and produce a concise presentation.

1.4. Content of the course

1. Universal tools in the Windows environment.
2. CAD – explanation of the terms CAD, CAE, CAM, CAAD, steps in computer design, overview of some CAD programs for construction and architecture, difference between vector and bitmap images.
3. Example of a package for technical drawing - application, principle of operation, coordinate system, types of commands, additional software as an upgrade.
4. GIS: Geographic Information Systems: definition, areas of application, attribute and spatial data, classification of queries in GIS, overview of some existing GIS tools, example of WEBGIS, application of GIS in construction with examples.
5. Organization of data. Databases. Organization of files.
6. web design: the basics of the HTML language, an overview of programs for creating web pages.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Students are scored for completed exercises on the computer and the final test. To obtain a signature, it is necessary to have a certain number of points.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Exercises and seminars 70%, exam 30%.

1.10. Compulsory literature

1. Lecture materials presented on the course website www.gradri.hr/~informatika
2. Addresses of relevant websites offered on the course website
3. Books directly related to the software presented at the exercises - the literature is updated every year

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Lecture materials presented on the course website	Merlin System	75
Addresses of relevant websites offered on the course website	Available online	
Books directly related to the software presented at the exercises - the literature is updated every year	-	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Asst. Prof. Ksenija Tijanić Štrok, Ph.D	
Course	VOCATIONAL PRACTICE	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	15
	Number of hours (L+E+S)	0+360+60

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Introduction to the practical application of organizational and technological knowledge through solving specific tasks on the construction site.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Solve tasks/problems of construction preparation and construction itself by procedures/methods from the organization, technology and economics of construction.
2. Apply the acquired knowledge from other professional courses to solve specific problems on the construction site.
3. Solve an organizational and technological task for a specific construction site.
4. Present in writing and orally explain the selected organizational and technological solution.
5. Keep a construction diary.

1.4. Content of the course

Work on the construction site for 45 working days

1.5. Types of teaching	☐ lectures ☐ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Work on the construction site for 45 working days (360 h), preparation of professional practice studies: construction diary, seminar

1.8. Monitoring student work

Attending classes		Teaching activity		Seminar paper	2	Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment		Report		Practical work	
Portfolio		Program task		Laboratory		Fieldwork	13

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Elaborate of professional practice, defense of the study

1.10. Compulsory literature

1. Linarić, Z.: Lexicon of Machines and Equipment for the Production of Building Materials, Business Media Croatia, Zagreb, 2007.

1.11. Supplement literature

1. Bučar, G.: Carpentry, Reinforcement and Concrete Works on the Construction Site, Faculty of Civil Engineering J.J.Strossmayer, Osijek, 1997.
2. Trbojević, B.: Organization of Construction Works, Scientific Book, Belgrade, 1992.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Linarić, Z.: Lexicon of Machines and Equipment for the Production of Building Materials, Business Media Croatia, Zagreb, 2007.	5	75

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Asst. Prof. Sara Grbčić Erdelj, Ph.D; Asst. Prof. Teo Mudrić, Ph.D	
Course	TECHNICAL MECHANICS I	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	4,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The student should master basic theoretical knowledge of mechanics, material resistance and statics.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Understand the basics of equilibrium of forces in the plane and apply them to various static systems.
2. Be able to solve various static systems and determine cutting force diagrams.
3. Understand the occurrence of stresses in girder cross-sections for cases of simple (uniaxial) and complex stress conditions.
4. Acquire the necessary prior knowledge for the subjects of Technical Mechanics II, Concrete and Masonry Structures, Wooden Structures and Steel Structures.

1.4. Content of the course

Balance of forces in the plane. Graphical and analytical methods.
Center of gravity. Geometric characteristics of the cross-section.
Simple constructive systems, static definiteness and indeterminacy, internal forces.
Statically determined beams, simple beams, Gerber beams, three-hinged arches, calculation methods and typical examples.
Truss supports, calculation methods and examples
The concept of stress and deformation.
Analyses of in-plane stresses, principal stresses. Stress and strain bond.
Shear from transverse force and torsion. Calculation of compounds and fasteners.
Pure bending, bending with transverse force, oblique bending.
The relationship between cutting forces and cross-sectional stresses, characteristic examples

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending lectures and exercises. Preparation of the program assignment, passing the colloquium and final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	0,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Exercises and colloquia (70%), written and oral exam (30%).

1.10. Compulsory literature

1. V. Simović: Building Statics I., Zagreb 1988.
2. V. Andrejev: Mechanics I (statics), Zagreb, 1969.
3. J. Brnić: The Science of Firmness, Zagreb 1991.
4. Ram-Wagner: "Građevinska statilka 4", Beograd, 1972.

1.11. Supplement literature

1. V.Šimić: Resistance of Materials I, Zagreb 1992.
2. V.Šimić: Resistance of Materials II, Zagreb 1995.
3. D. Bazjanac: Nauke o solidoću, Zagreb, 1968.
4. M. Andelić: Statics of Indefinite Stick Construction, Zagreb, 1993.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
V. Simović: Building Statics I., Zagreb 1988.	4	75
V. Andrejev: Mechanics I (statics), Zagreb, 1969.	1	
J. Brnić: The Science of Firmness, Zagreb 1991.	14	
Ram-Wagner: "Građevinska statilka 4", Beograd, 1972.	1	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Emina Hadžalić, Ph.D; Asst. Prof. Teo Mudrić, Ph.D	
Course	TECHNICAL MECHANICS II	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The student should master basic theoretical knowledge of mechanics, material resistance and statics.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Learning the basic concepts and principles in the classroom.
2. Determine the displacements and turns on a statically determined beam model.
3. Determine the lattice offsets.
4. Use the unit force method and the displacement method to determine displacements and turns on a statically indeterminate system.
5. On several simpler examples, demonstrate knowledge of different methods for determining displacements and turns.

1.4. Content of the course

The relationship between stress, deformation and displacement
Elastic line when folding.
The Unit Force Method, the Vereshchagin Method.
Deflection. Euler's Critical Force.
Statically indeterminate supports, force method, displacement method.
Indeterminate constructions, methods of solving and characteristic examples up to 2 indeterminate quantities

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending lectures and exercises. Passing the colloquium and final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	0,75	Viva voce	0,25	Assay		Research	
Project		Continuous Knowledge Assessment	2,5	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Exercises and colloquia (70%), written and oral exam (30%).

1.10. Compulsory literature

1. V. Simović: Building Statics I., Zagreb 1988.
2. V. Andrejev: Mechanics I (statics), Zagreb, 1969.
3. J. Brnić: The Science of Firmness, Zagreb 1991.
4. Ram-Wagner: "Građevinska statika 4", Beograd, 1972.

1.11. Supplement literature

1. V. Šimić: Resistance of Materials I, Zagreb 1992.
2. V. Šimić: Resistance of Materials II, Zagreb 1995.
3. D. Bazjanac: Nauke o solidoću, Zagreb, 1968.
4. M. Andelić: Statics of Indeterminate Stick Construction, Zagreb, 1993.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
V. Simović: Building Statics I., Zagreb 1988.	4	75
V. Andrejev: Mechanics I (statics), Zagreb, 1969.	1	
J. Brnić: The Science of Firmness, Zagreb 1991.	14	
Ram-Wagner: "Građevinska statilka 4", Beograd, 1972.	1	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Ivan Marović, Ph.D	
Course	CONSTRUCTION TECHNOLOGY	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	3,5
	Number of hours (L+E+S)	30+15+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Acquisition of basic technological knowledge necessary for the design of technology and construction of buildings.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. To design the technological sequence and the associated components of the process on the construction site in monolithic construction.
2. To design the technological sequence and the associated components of the process on the construction site in prefabricated construction.
3. Shape the technological sequence and associated process components in the production plant.
4. Identify and select suitable construction machinery and equipment.
5. Evaluate variant technological solutions.

1.4. Content of the course

1. Basic settings of construction technology
2. Earthmoving technology
3. Technology of concrete and reinforced concrete works
4. Technology of masonry work
5. Technology of pavement curtains
6. Formwork and scaffolding technology
7. Technique and technology of execution of buried pipelines – «microtunneling»
8. Technique and technology of prefabricated construction
9. Demolition technology
10. Asphalt Fracture Recycling Technology

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at lectures 70% and exercises 70%, positively evaluated program. Passing the colloquium and final exam.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task	0,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums and program assignment (70%), exam (30%).

1.10. Compulsory literature

1. Mlinarić, V.; Construction Technology, Croatian University Press, Zagreb University of Applied Sciences, Zagreb, 2017
2. Linarić, Z.: Lexicon of Machinery and Equipment for the Production of Building Materials - Effects of Machinery and Vehicles in Earthworks, Business Media Croatia, Zagreb, 2007.
3. Bučar, G.: Normatives of Construction Works - Handbook for Construction Entrepreneurship ICG, Omišalj, Rijeka, 1999.

1.11. Supplement literature

1. Bučar, G.: Norms and Prices in Construction, ICG, Omišalj, Faculty of Civil Engineering in Rijeka, Rijeka, 2003.
2. Božić, B.: Blasting in Mining, Construction and Geotechnics, University of Zagreb, Faculty of Geotechnical Engineering, Varaždin, 1998.
3. Mikulić, D.: Construction Machinery: Construction, Calculation and Use, Mikulić, D., Zagreb, 1998.
4. Linarić, Z.: Plants for the production of bulk and related mineral materials: crushing plants, concrete factories, asphalt bases, Business Media Croatia, Zagreb, 2009.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Mlinarić, V.; Construction Technology, Croatian University Press, Zagreb University of Applied Sciences, Zagreb, 2017	15	75
Linarić, Z.: Lexicon of Machinery and Equipment for the Production of Building Materials - Effects of Machinery and Vehicles in Earthworks, Business Media Croatia, Zagreb, 2007.	5	
Bučar, G.: Normatives of Construction Works – Handbook for Construction Entrepreneurship, ICG, Omišalj, Rijeka, 1999.	13	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	dr.sc. Tomislav Uzelac-Šćiran, lecturer	
Course	PHYSICAL EDUCATION	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	1
	Number of hours (L+E+S)	0+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The goals of the course are to provide an educational environment that will stimulate the interests of students, their intellectual development and prepare them for their professional obligations. Exercise develops their opportunities to become successful in different areas.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Prevention and preservation of health through PE teaching programs.
2. Encourage responsibility and independence in the implementation of the curriculum.
3. Present and improve the work on trainers for the development of motor skills.
4. To train students in the development of individual fitness exercise programs.
5. Develop healthy work and hygiene habits.
6. Prevent health with a controlled diet and utilitarian exercise.

1.4. Content of the course

Group and individual exercises (fitness, tennis, swimming, hiking, etc.) according to the students' choice, but depending on the financial and material possibilities of the Faculty to provide the necessary and adequate funds.

1.5. Types of teaching	☐ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance continues at 70%.

1.8. Monitoring student work

Attending classes	1	Teaching activity		Seminar paper		Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment		Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

lacks

1.10. Compulsory literature

lacks

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Goran Volf, Ph.D	
Course	HYDRAULIC STRUCTURES	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

To ensure that students master the basics of hydrology, hydrostatics and hydraulics of free-flowing, pressurized and groundwater flow, as well as the basics of water supply and sewerage systems, watercourse regulation and land reclamation.
To point out to students the interconnections of natural water systems and hydrotechnical solutions.

1.2. Conditions for enrolment in courses

-

1.3. Expected learning outcomes for the subject

1. Recognize the specifics of water resource management in urban areas.
2. Define and explain basic hydrological phenomena and calculate basic hydrological parameters.
3. Define, describe and sketch the types and hydrotechnical elements of water systems.
4. To analytically look at the hydrotechnical aspects of water regulation, and the protection and use of water resources - as well as their interactions in the urban environment.
5. Prepare an analytical description of various water management facilities and solutions.

1.4. Content of the course

- Definition, importance, goals and tasks of hydraulic engineering.
- Water management: water use, water protection, protection against harmful effects of water. Planning. Legislation.
- Basics of hydrology (hydrological cycle, hydrometeorology, characteristics of the basin and processes in the basin, hydrometry).
- Basics of hydraulics (hydrostatics, hydromechanics, pressure flow, flow with a free water face, leakage over spillways and under sluices, hydraulic jump, groundwater flow).
- Basics of water supply systems (types of water supply systems, categories of water consumption, water sources and water abstractions, pumping stations, water conditioning, water reservoirs, water supply networks).
- Basics of sewage systems (types of sewage systems, types of wastewater, sewerage networks, buildings, wastewater treatment, discharges).
- Basics of commercial hydraulic engineering (morphology of the river bed, regulation of watercourses, regulation of torrents, hydromelioration systems - pedology, crop rotation, drainage, irrigation).

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____

1.6. Comments	A visit to the Hydraulic Engineering Laboratory is planned.

1.7. Obligations of students

Attending lectures and exercises according to the standards of the Faculty.
Creation and submission of program tasks.
Passing the colloquium.
Passing the final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	1,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Preparation of program tasks, attendance at classes, colloquia – 70%, final exam – 30%.

1.10. Compulsory literature

1. Vuković, Ž.: Basics of Hydraulic Engineering (Part One, Book One), Aquamarine, Zagreb, 1994.
2. Vuković, Ž.: Basics of Hydraulic Engineering (Part One, Book Two), Aquamarine, Zagreb, 1996.

1.11. Supplement literature

1. Žugaj, R.: Hydrology, RGN faculty, Zagreb, 2002.
2. Margeta, J.: Basics of Water Management, Faculty of Civil Engineering in Split, Split, 1992.
3. Jović, V.: Basics of Hydromechanics, Faculty of Civil Engineering in Split, Split, 2006.
4. Savić, Lj. M.: Introduction to Hydraulic Engineering Structures, Faculty of Civil Engineering in Belgrade, Belgrade, 2003.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Vuković, Ž.: Basics of Hydraulic Engineering (Part One, Book One), Aquamarine, Zagreb, 1994.	6	75
Vuković, Ž.: Basics of Hydraulic Engineering (Part One, Book Two), Aquamarine, Zagreb, 1996.	8	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Leo Matešić, Ph.D	
Course	ENVIRONMENTAL PROTECTION	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	3
	Number of hours (L+E+S)	15+0+15

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Preparing students for a basic understanding of the global ecological system, the importance of biodiversity and biogeochemical cycles, then the basic principles of environmental protection and the possible negative impact of construction works.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Understand global changes in the ecological system and the functioning of its components.
2. Know the applicable legislation in the field of environmental protection in the Republic of Croatia.
3. Know the fundamental impacts of construction projects on the environment and the principles of environmental protection.
4. Analyze the basics of waste management problems.
5. Know the principles of developing an environmental impact strategy.
6. Know the principles of sustainable development in construction from the aspect of environmental protection.

1.4. Content of the course

Basic principles of environmental protection.
Biodiversity and biogeochemical cycles.
Global ecosystem: the interaction of the geosphere, hydrosphere, biosphere and atmosphere.
Human activity and environmental changes.
air pollution and climate change.
Pollution of surface and groundwater.
Pollution of the seas and oceans.
Soil contamination.
Construction works and environmental protection.
Nature protection in the Republic of Croatia.
Environmental protection in the Republic of Croatia.
Sustainable development planning.

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at lectures.
One seminar and a colloquium during the lecture period. Passing the final exam.

1.8. Monitoring student work

Attending classes	1	Teaching activity		Seminar paper	0,75	Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,75	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Assessment and evaluation are conducted during classes. The total number of points that can be earned is 100% during the course.

1.10. Compulsory literature

1. Benac, Č.: ENVIRONMENTAL PROTECTION FOR STUDENTS OF CIVIL ENGINEERING. Faculty of Civil Engineering, University of Rijeka, 2004 www.gradri.hr
2. Glavač, V.: INTRODUCTION TO GLOBAL ECOLOGY. Croatian University Fee, Ministry of Environmental Protection and Physical Planning, Public Open University-Zagreb. Zagreb, 2001.

1.11. Supplement literature

1. Springer, P.O., ed.: ECOLOGICAL LEXICON. Ministry of Environmental Protection and Physical Planning, Barbat, Zagreb. Zagreb, 2001.
2. Botkin, D.B.and Keller, E.A.: ENVIRONMENTAL SCIENCE, John Wiley and Sons (4. ed.), 2003.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Benac, Č.: ENVIRONMENTAL PROTECTION FOR STUDENTS OF CIVIL ENGINEERING. Faculty of Civil Engineering, University of Rijeka, 2004	2	50
Glavač, V.: INTRODUCTION TO GLOBAL ECOLOGY. Croatian University Fee, Ministry of Environmental Protection and Physical Planning, Public Open University-Zagreb. Zagreb, 2001.	1	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader		
Course	FINAL YEAR PROJECT	
Study program	**Professional Undergraduate Study of Civil Engineering**	
Course status	**Compulsory**	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	15
	Number of hours (L+E+S)	0+0+60

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

A successful completion of the final thesis exam is proof that the student is able to independently create and present a large-scale seminar paper (conceptual solution or solution to a practical problem) related to less complex building structures or systems during the study, and that he or she is able to make a detailed cost estimate of works and materials for the designed/reconstructed structure.

1.2. Conditions for enrolment in courses

Passing 120 ECTS credits in the first and second year of study

1.3. Expected learning outcomes for the subject

1. Define a professional problem.
2. Design and independently conduct research.
3. Solve a practical problem/task independently.
4. Apply the acquired knowledge and general competencies acquired through the study.
5. Apply the acquired knowledge and specific competencies in the relevant subject.
6. Apply the methodology of writing a professional and scientific work.
7. Make a presentation of the results of the conducted research using multimedia tools.
8. Use presentation skills in interpreting research results.

1.4. Content of the course

The final thesis is prepared by the student during the planned 60 hours of active teaching at the Faculty and a total engagement of 280 hours of work (15 ECTS credits).
The final thesis can be written by the student on a practical topic related to construction and close in content to the existing subjects. The student chooses the topic of the final thesis, and the committee for awarding the final thesis approves during the VI semester, and no later than 01.05. of the current year.
The final thesis can take the form of:
- conceptual design of a simpler building (out-of-town road, simpler drainage or water supply system, earthworks calculation or similar),
- a project for the organization of the construction of a simpler facility,
- static calculation of a building made of concrete, metal or wood,
- development of the project of high-rise buildings with a cost estimate and others.

In the preparation of the final thesis, the student actively cooperates with the teacher-mentor, as a rule, it is the teacher of the subject whose content is related to the selected topic. A teacher-commentator can also participate in the preparation of the final work if the content of the work requires it.

1.5. Types of teaching	☐ lectures ☐ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☒ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

The student is obliged to submit the written part of the work (in working form) to the teacher-mentor as a confirmation of the fulfillment of obligations in the semester in which the topic was assigned, and according to the deadlines that are adopted for each academic year. year.
The student is obliged to submit the final thesis (in the final written and digital form) to the student office within the deadlines for the defense of the thesis that are adopted for each academic year. year.

1.8. Monitoring student work

Attending classes		Teaching activity		Seminar paper		Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment		Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

80% final paper + 20% presentation of the program

1.10. Compulsory literature

depending on the topic

1.11. Supplement literature

depending on the topic

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Željko Smolčić, Ph.D	
Course	CONCRETE AND MASONRY STRUCTURES	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE		
1.1. Course objectives		
Acquisition of theoretical and practical knowledge of concrete and masonry structures.		
1.2. Conditions for enrolment in courses		
Basics of Concrete and Masonry Structures – passed		
1.3. Expected learning outcomes for the subject		
1.Calculate plates load-bearing in two directions (cross-reinforced plates). 2.Calculate the reinforced concrete slab to the puncture. 3.Check reinforced concrete beams and slabs according to the serviceability limits. 4.Explain the methods of determining static quantities in reinforced concrete rod structures. 5.Determine second-order effects in slender compressive elements. 6.Define the basic concepts of reinforced masonry. 7.Define the basic concepts of prestressed concrete.		
1.4. Content of the course		
Calculation of plates load-bearing in two directions (cross-reinforced slabs). Calculation of the plates on the breakthrough. Dimensioning of slender elements loaded with eccentric compressive force. Dimensioning of torsion-stressed elements. Determination of Cutting Forces in Bar Reinforced Concrete Structures. Linear theory of elasticity with limited redistribution. Usability limits of reinforced concrete structures. Marginal state of deformation. The budget is sagging. Borderline state of cracks. Calculation of the width of the cracks. Reinforced concrete foundations, staircases. Basic concepts of prestressed concrete. Prestressing steel. Types and degree of prestressing. Introduction of a preload force. Loss of preload force. Masonry structures in seismic areas. Calculation of masonry structures.		
1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____

1.6. Comments	

1.7. Obligations of students

Attending lectures and exercises, creating a program, passing two colloquia and a final exam
During classes through the program and colloquium, the student acquires a maximum of 70% of the grade.
On the exam, the student acquires a maximum of 30% of the grade.
The condition for signing is the acquired 35% of the grade during classes.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,5	Report		Practical work	
Portfolio		Program task	1	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Exercises, colloquia and programs 70%, exam 30%.

1.10. Compulsory literature

1. Sorić, Z.; Kišiček, T.: Concrete Structures 1, University of Zagreb - Faculty of Civil Engineering, Zagreb, 2014.
2. Sorić, Z.; Kišiček, T.: Concrete Structures 2, University of Zagreb - Faculty of Civil Engineering, Zagreb, 2018.
3. Sorić, Z.: Masonry Structures, Zorislav Sorić, Zagreb, 2016.

1.11. Supplement literature

1. Tomičić, I.: Concrete Structures Selected Chapters, DGKH, Zagreb 1996.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Sorić, Z.; Kišiček, T.: Concrete Structures 1, University of Zagreb - Faculty of Civil Engineering, Zagreb, 2014.	10	50
Sorić, Z.; Kišiček, T.: Concrete Structures 2, University of Zagreb - Faculty of Civil Engineering, Zagreb, 2018.	10	
Sorić, Z.: Masonry Constructions, Zorislav Sorić, Zagreb, 2016.	21	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Paulina Krolo, Ph.D	
Course	STEEL STRUCTURES	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The acquisition of basic knowledge of the procedures and methods of application of steel in construction enables the acquisition of basic competencies in the construction of simple static systems and small spans and is the basis for further education in the field of steel structures and construction in general.

1.2. Conditions for enrolment in courses

Technical Mechanics I and Technical Mechanics II – passed

1.3. Expected learning outcomes for the subject

1. Describe the phases and procedures of steel production, steel properties, list the types and qualities of steel in construction.
2. Explain the concept of reliability, apply actions to the structure, determine combinations of actions, explain the rotational capacity and rotational ability of cross-sections, explain cross-sectional classes, determine cross-sectional class, perform cross-sectional reduction.
3. Explain the resistance of cross-sections to longitudinal force, bending, shear and torsion, calculate the resistance of cross-sections, explain the resistance of elements to longitudinal force and bending, calculate the resistance of elements to buckling and lateral torsional buckling.
4. Describe frame systems, list frame components, describe ways of classifying frames
5. Enumerate and describe the types of fasteners, analyze the connection and determine the computational actions on the fasteners, calculate the resistance of the fasteners, design the connections.
6. Explain the technology of welded joints, list and describe the ways of quality control of welded joints.
7. List and describe parts of the hall, list the types of halls, explain the choice of the construction system of the hall, explain the stabilization of the hall, list the types of stabilization of the hall, analyze the hall and carry out stabilization, describe the lining of the hall.

1.4. Content of the course

- General overview of steel structures: historical development and modern systems.
- Features of steel: production and properties.
- Types of construction steels, rolling products.
- Basics of fire safety, protection and durability of steel structures. Resistance of cross-sections and elements of steel structures (EC3).
- Fasteners in steel structures: types of fasteners and calculation of joints.
- Structural design and basics of designing joints and connections in steel structures.
- Lattice steel systems, Compulsory and frame systems.
- The basics of calculation, force transmission and structural design of characteristic details.
- Basics of spatial stability of steel structures.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending classes, creating a program assignment (abbreviated main project of a steel structure of a simple system and a small span), passing the colloquium and the final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1,2	Report		Practical work	
Portfolio		Program task	1,3	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Grade - exam (30%) and evaluation of work in the semester - program, presentation/oral examination of knowledge and independence, colloquia and activity (min. 40%, max 70%).

1.10. Compulsory literature

1. Androić B.; Dujmović D.: Steel Structures - Part 1., Fair, Zagreb, 2021
2. Androić B.; Dujmović D.: Steel Structures - Part 2, Fair, Zagreb, 2021

1.11. Supplement literature

1. Dujmović, D., Androić, B., Džeba, I.: Modeling of structures according to EUROCODE 3, IA Projektiranje, Zagreb, 2004.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Androić B.; Dujmović D.: Steel Structures - Part 1., Fair, Zagreb, 2021	21	40
Androić B.; Dujmović D.: Steel Structures - Part 2, Fair, Zagreb, 2021	21	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Saša Čohar Mančić, senior lecturer	
Course	ENGLISH LANGUAGE	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory / Electoral	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	3,5
	Number of hours (L+E+S)	30+0+15

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Training students to use English in spoken and written form as a profession.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Primjena stečenih znanja u pisanom obliku (The Tense System, Conditional Clauses, Hypothesizing, Word Formation, Vocabulary).
2. Primjena stečenih znanja u pisanom obliku (Verb Patterns, Prepositions, Prepositional Phrases, Indirect Speech, Indirect & Wh-Questions, Modals, Relative Clauses, Transformations, Vocabulary).
3. Application of acquired knowledge in oral form (retelling of texts, Vocabulary).
4. Ability to express and argue in a foreign language.
5. Basic conversation in a foreign language.

1.4. Content of the course

Grammatical topics (general grammatical laws of the English language, specific grammatical structures inherent in the professional language, and coincidences and differences at the grammatical level between English and Croatian):
- Formation-morphological level (types of words, morphological changes, word formation)
- Syntactic level (types of sentences, sentence parts, order of sentence components; use and arrangement of verb tenses, active-passive relationship, participle and infinitive constructions).

Lexical topics (general lexicon and professional and professional terminology):
- building materials, building construction, transport technology, hydraulic structures, geodesy, building construction, civil engineering

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Activity during classes, colloquia, seminar presentation.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper	1	Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Activity during classes, colloquia, seminar presentation.

1.10. Compulsory literature

1. Kralj Štih, A.: English in Civil Engineering, Hrvatska sveučilišna naklada, Zagreb, 2004.
2. Murphy, R.: English Grammar in Use with Answers (Intermediate Level), Cambridge University Press, Cambridge, 2004.
3. Thomson, A.J., Martinet, A. V.: A Practical English Grammar, Exercises 1,Oxford University Press, Oxford, 1986.
4. Thomson, A.J., Martinet, A. V.: A Practical English Grammar, Exercises 2,Oxford University Press, Oxford, 1986.

1.11. Supplement literature

1. Z. Vulelija: Illustrated Dictionary of Architecture and Construction; Zagreb, Masmedia
2. Thomson / Martinet Trainee of English Grammar, OUP, 1999.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Kralj Štih, A.: English in Civil Engineering, Hrvatska sveučilišna naklada, Zagreb, 2004.	5	75
Thomson, A.J., Martinet, A. V.: A Practical English Grammar, Exercises 1,Oxford University Press, Oxford, 1986.	4	
Thomson, A.J., Martinet, A. V.: A Practical English Grammar, Exercises 2,Oxford University Press, Oxford, 1986.	4	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Bojana Horvat, Ph.D	
Course	INSTALLATIONS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+25+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Ensure that students master the basics of building installations within the course.

To train students to independently solve the basics of installation and calculation of hydro installations.

1.2. Conditions for enrolment in courses

Hydraulic Structures - *enrolled*

1.3. Expected learning outcomes for the subject

1. Define, describe and sketch the types and elements of water and sewage installations in buildings (cold and hot water installations, sanitary facilities, wastewater installations).
2. Describe and define electrical and gas installations in buildings.
3. Describe and define heating and central heating installations and list the materials from which they are made.
4. Define and explain the methods of solid waste disposal from buildings (types of waste, methods of collection, landfills).
5. To develop a conceptual design of water supply and sewerage systems in the building with all the accompanying elements.
6. Choose the appropriate water supply and sewerage system and argue the selected one.
7. Analyze the problem of water supply by defining the required amounts of water to supply the building, and analyze the problem of drainage by defining the amount of wastewater of the building.

1.4. Content of the course

- Types of installations in buildings: significance and functions.
- Sanitary facilities.
- Installation of a cold water supply from the connection to the public water supply to the outlet.
- Installation of hot water supply.
- Installation of wastewater drains to the connection to the public sewage system, wastewater disposal systems of individual buildings without the possibility of connection to the sewer.
- Storm water drainage installations, absorbent wells.
- Basics of calculation of plumbing.
- Mechanical installations of heating, ventilation and air conditioning.
- Electrical wiring in buildings.
- Gas installations in buildings.
- Disposal of solid waste from buildings.
- Communications, security and other special installations in buildings.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☒ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending lectures and exercises according to the standards of the faculty.
Creation and submission of the program from the exercises. Colloquiums. Final exam.

1.8. Monitoring student work

Attending classes		Teaching activity	0,8	Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	1	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Preparation of the program and seminar, attendance at classes, colloquia – 70%, exam – 30%.

1.10. Compulsory literature

1. Radonić, M.: Water Supply and Sewerage in Buildings, Croatia knjiga, Zagreb, 2003.

1.11. Supplement literature

1. Tušar, B: Home Sewerage, Faculty of Civil Engineering in Zagreb, Zagreb, 2001.
2. Čargonja, K., Čargonja, N.: Installations of Water Supply and Sewerage, Zagreb, 1990.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Radonić, M.: Water Supply and Sewerage in Buildings, Croatia knjiga, Zagreb, 2003.	6	75

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Asst. Prof. Paulo Šćulac, Ph.D	
Course	PREFABRICATED STRUCTURES	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+20+10

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Understanding and mastering the material presented in lectures and exercises enables students to acquire limited competencies in the design and construction of prefabricated structures, and the acquisition of basic knowledge about the systems and technology of prefabricated buildings is the basis for further education in the field of construction in general.

1.2. Conditions for enrolment in courses

Basics of Concrete and Masonry Structures - passed

1.3. Expected learning outcomes for the subject

1. Explain the general characteristics of prefabricated construction, advantages and disadvantages.
2. Describe and sketch the procedures for the construction of prefabricated structures.
3. Explain the technological process of assembly.
4. Enumerate, describe and evaluate compounds. Calculate simpler joints in frame structures.
5. Define and identify bearing types.
6. Select the appropriate prefabricated elements of prefabricated halls.

1.4. Content of the course

Industrial method of construction: peculiarities, advantages and disadvantages. Precast concrete structures: large-area, skeletal, spatial and mixed systems. Prefabricated and semi-prefabricated ceiling systems. Lightweight concrete and brick systems. Prefabricated structures made of steel, wood and artificial materials. Prefabricated concrete halls. Residential buildings made of concrete, steel, wood and a combination of materials. Limitation of damage from extraordinary actions. Examples of damage to prefabricated concrete structures in an earthquake. Transport. Assembly: order, machinery, scaffolding. Overview of completed buildings: photos and videos of buildings in the design, construction and use phase. Construction of bridges from prefabricated concrete elements.

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☒ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

- Attendance at classes, preparation and defense of the program assignment, preparation and presentation of seminar papers, passing colloquiums and final exams.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper	0,75	Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	0,75	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

During the semester (continuous examination of knowledge through ~~colloquiums and~~ colloquiums, preparation of a program assignment and seminar paper) 70% of the total grade, exam 30% of the total grade.

1.10. Compulsory literature

1. Rex., S.: Industrial Construction Part II - Prefabricated Construction, Faculty of Civil Engineering, University of Zagreb, 1983
2. Trivunić, M.R.; Dražić, J.J.: Assembly of Concrete Structures of Buildings, AGM Book, Belgrade 2009.

1.11. Supplement literature

1. Šram, S. Bridge Construction: Concrete Bridges, Golden Marketing, Zagreb, 2002.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Rex., S.: Industrial Construction Part II - Prefabricated Construction, Faculty of Civil Engineering, University of Zagreb, 1983	6	50
Trivunić, M.R.; Dražić, J.J.: Assembly of Concrete Structures of Buildings, AGM Book, Belgrade 2009.	1	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Ivana Štimac Grandić, Ph.D	
Course	BRIDGES	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory / Electoral	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+15+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Acquiring basic knowledge about the issues and activities of bridge construction with an emphasis on bridge construction.

1.2. Conditions for enrolment in courses

Technical Mechanics I – passed

1.3. Expected learning outcomes for the subject

1. Identify and list the types of bridges, their structural systems and parts.
2. Identify and explain the purpose of bridge supports and bearings, list the bridge equipment and explain its purpose.
3. Make drawings of a single-span beam bridge.
4. Select and describe possible construction methods depending on the type of span assembly and bridge supports.

1.4. Content of the course

- History of Bridge Construction
- General information on bridges; types of bridges; elements of the bridge layout; Traffic conditions and external actions
- Load-bearing structures in bridges; lower structure; Bridge equipment
- Bridge construction; Maintenance of bridges

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☒ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at lectures and exercises in accordance with the Study Regulations.
The presence of a field tour of bridges.
Creation and submission of the program task. Continuous examination of knowledge and final exam.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task	1	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

During the semester (continuous examination of knowledge through colloquia and preparation of the program assignment) 70% of the total grade, exam 30% of the total grade.

1.10. Compulsory literature

1. Radić, J.: Bridges, Home and World, Zagreb, 2002.

1.11. Supplement literature

1. Šram, S.: Construction of Bridges, Golden Marketing, Zagreb, 2002.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Radić, J.: Bridges, Home and World, Zagreb, 2002.	12	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Saša Čohar Mančić, senior lecturer	
Course	GERMAN LANGUAGE	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Compulsory / Electoral	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	3,5
	Number of hours (L+E+S)	30+0+15

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Training of students to use the German language in spoken and written form as a profession.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Primjena stečenih znanja u pisanom obliku (tenses in active and passive forms, declension of pronouns and adjectives, translation, vocabulary).
2. Primjena stečenih znanja u pisanom obliku (prepositions, relative, final and temporal sentences, infinitive constructions, word formation, vocabulary).
3. Application of acquired knowledge in oral form (retelling of texts, Wortschatz).
4. Ability to express and argue in a foreign language.
5. Basic conversation in a foreign language.
6. Written and oral expression in a foreign language using general and professional expressions (topics of the seminar paper by agreement).

1.4. Content of the course

Grammatical topics (general grammatical rules of the German language, specific grammatical structures inherent in the professional language, and coincidences and differences at the grammatical level between German and Croatian):
- Formation-morphological level (types of words, morphological changes, word formation)
- Syntactic level (types of sentences, sentence parts, order of sentence components; use and arrangement of verb tenses, active-passive relationship, participle and infinitive constructions).

Lexical topics (general lexicon and professional and professional terminology):
- building materials, building construction, transport technology, hydraulic structures, geodesy, building construction, civil engineering

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at classes in accordance with the Study Regulations.
- Two written and one oral colloquium. The points achieved at the colloquiums are added up (each written one is worth 30% and the oral one is worth 40% of the points). The condition for enrolment in ECTS credits is a total of 50% of credits.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper	1	Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Activity during classes, colloquia, seminar presentation.

1.10. Compulsory literature

1. Kralj Štih, A.: Deutsch im Bauingenieurwesen, Hrvatska sveučilišna naklada, Zagreb, 2005.
2. Seiffarth, A., Medaglia C.: Arbeitsgrammatik, Cideb Editrice, Genoa, 2006.
3. Engler, T.: Deutsche Grammatik – kein Problem, Školska knjiga d.d., Zagreb, 2002.

1.11. Supplement literature

1. Prager, A.: Trilingual Construction Dictionary, Zagreb: Masmedia, 2003.
2. T. Engler - Trainee of German Grammar, Školska knjiga, 2002

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Kralj Štih, A.: Deutsch im Bauingenieurwesen, Hrvatska sveučilišna naklada, Zagreb, 2005.	4	20
Engler, T.: Deutsche Grammatik – kein Problem, Školska knjiga d.d., Zagreb, 2002.	4	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	**Prof. Igor Ružić, Ph.D**	
Course	**COASTAL STRUCTURES**	
Study program	**Professional Undergraduate Study of Civil Engineering**	
Course status	**Electoral**	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Developing general competencies (knowledge and skills) of students on the issue of construction in the coastal and underwater world. the interaction of the sea with coastal/protective structures, the typology of protective breakwater and coastal fortifications, the basics of dimensioning and equipping the coasts.

1.2. Conditions for enrolment in courses

Geotechnical Engineering - passed

1.3. Expected learning outcomes for the subject

1. Explain the basics of physical oceanography, marine hydrography and the mechanisms of generating sea currents and waves.
2. Apply different methods of calculation of basic wave parameters.
3. Explain the nature and mechanism of coastal processes on natural and artificial coasts.
4. Size the breakwater and the bank, check the stability and impact on the foundation soil.
5. Explain the methods of fortifying the banks, analyze the buffer system on the banks and describe their construction and equipment.

1.4. Content of the course

Introduction, types of coastal structures, specifics of construction in the coastal area.
Coastal processes, winds and sea currents.
Waves, design conditions, wave transformation in shallow water.
Breakwaters - general characteristics.
Calculation and sizing of inunflated breakwaters.
Combined breakwaters, vertical massive breakwaters, calculation and sizing.
Embankments, types and sizing.
Lightweight shore fortification systems.
Ports open to public traffic and special purpose ports.
Mooring systems and equipment of the coast.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending lectures and exercises according to the standards of the faculty, creating and submitting exercise programs, field visits to representative coastal buildings, colloquia and final exams.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	1,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Preparation of the program and seminar, attendance at classes, colloquia – 70%, exam – 30%.

1.10. Compulsory literature

1. Carević, D. and Pršić, M: Maritime Structures, University of Zagreb, Faculty of Civil Engineering, 2018.
2. Kirinčić, J.: "Ports and Terminals", Školska knjiga, Zagreb, 1991.

1.11. Supplement literature

1. USACE Coastal Engineering Manual, 2007.
2. Abbot, M.B. & Price, W.A.: "Coastal, Estuarial and Harbour Engineer's Reference Book", 1994.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Kirinčić, J.: "Ports and Terminals", Školska knjiga, Zagreb, 1991.	3	50

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Aleksandra Deluka-Tibljaš, Ph.D, Prof. Barbara Karleuša, Ph.D, Assoc. Prof. Silvija Mrakovčić, Ph.D	
Course	SUSTAINABLE URBAN TRANSPORT INFRASTRUCTURE	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	3
	Number of hours (L+E+S)	20+15+10

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

To introduce students to the possibilities of sustainable planning of transport infrastructure, taking into account the materials used, drainage conditions and environmental protection.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

- explain the basic elements of the transport system in the city and the rainwater drainage system
- explain the properties of materials needed for sustainable infrastructure solutions
- explain the interaction of drainage systems, transport infrastructure and the urban environment
- explore the theoretical possibilities of application and practical (laboratory) properties of the selected material

1.4. Content of the course

Elements of urban transport systems.
The impact of transport infrastructure on the urban environment.
Stormwater drainage systems in urban areas: system elements, connection to transport infrastructure and interaction with the environment.
The composition, properties and technology of materials for the construction of transport infrastructure.

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☒ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance, periodic examination, seminar work and laboratory work.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper	0,75	Experimental work	0,25
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	1,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Preparation of the program, attendance at classes, colloquia – 70%, final exam – 30%.

1.10. Compulsory literature

1. Bjegović, D., Štirmer, N.: Theory and Technology of Concrete
2. Beslać, J.: Materials in Architecture and Construction, Školska knjiga, Zagreb, 1989.
3. Margeta, J.: Rainwater and wastewater: pollution burden, protection measures, University of Split, Faculty of Civil Engineering and Architecture, Split, 2007.
4. Legac, Ivan and co-authors: City Roads, University of Zagreb, Zagreb, 2011.
5. Tumlin, Jeffrey: Sustainable Transporttation Planning, Willey, New Jersey, 2011.

1.11. Supplement literature

1. Pazwash, H.: Urban Storm Water Management, CRC Press, 2016.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Bjegović, D., Štirmer, N.: Theory and Technology of Concrete	20	12
Beslać, J.: Materials in Architecture and Construction, Školska knjiga, Zagreb, 1989.	5	
Margeta, J.: Rainwater and wastewater: pollution burden, protection measures, University of Split, Faculty of Civil Engineering and Architecture, Split, 2007.	2	
Legac, Ivan and co-authors: City Roads, University of Zagreb, Zagreb, 2011.	20	
Tumlin, Jeffrey: Sustainable Transporttation Planning, Willey, New Jersey, 2011.	1	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Goran Volf, Ph.D	
Course	WATER SUPPLY AND SEWERAGE	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

To ensure that students master the basic elements of water supply and sewerage systems design and their construction within the course.

To train students for the independent realization of elementary tasks in the field of water supply and sewerage and the elaboration of parts of projects.

1.2. Conditions for enrolment in courses

Hydraulic Structures - passed

1.3. Expected learning outcomes for the subject

1. Explain the basic concepts related to water and water resources (distribution of water in the hydrosphere, water quality).
2. Describe water supply and sewage systems and explain their way of functioning and their connection to the environment.
3. Define, describe and sketch the types and elements of water supply and sewerage systems.
4. To develop a conceptual design of the water supply and sewerage system (to make a technical description; to determine the relevant quantities; to size networks and facilities: pumps and water reservoirs, etc., to graphically show the water supply and sewerage system: situation, longitudinal profiles, cross-sections, details, etc.,).

1.4. Content of the course

Sources of water in nature. Types of water supply systems. Basics of sizing water supply systems. Water supply system facilities: intake structures, water conditioning devices, water reservoirs, pumping stations, pipelines (pipes, fittings and plumbing fittings), etc. The quality of drinking water. Installation and testing of watertightness of water supply pipelines. Water supply in extraordinary circumstances.
Types of wastewater. Types of sewage systems. Basics of dimensioning sewage systems. Types of channels. Installation of ducts and testing of watertightness of sewer systems. Facilities on the sewer network: retention basins, wastewater treatment plants, inspection shafts, cascades, overflows, etc. Discharge of wastewater into the receiver. Maintenance and management of sewage systems.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments	Within the teaching, one half-day field trip is planned to visit water supply and sewerage systems.	

1.7. Obligations of students

Attending lectures and exercises according to the standards of the Faculty.
Creation and submission of exercise programs.
Passing the colloquium.
Passing the final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	1,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Preparation of the program, attendance at classes, colloquia – 70%, final exam – 30%.

1.10. Compulsory literature

1. Vuković, Ž.: Basics of Hydraulic Engineering (Part One, Book Two), Aquamarine, Zagreb, 1996.
2. Gulić, I.: Water Supply, HSGI, Zagreb, 2000.
3. Margeta, J.: Sewerage of settlements: drainage and disposal of wastewater and rainwater; GF in Split, 2009

1.11. Supplement literature

1. Gulić, I: Water Conditioning, HSGI, Zagreb, 2003.
2. Tedeschi, S.: Protection of Water Systems and Wastewater Treatment, HDGI, Zagreb 1983.
3. Jović, V.: Basics of Hydromechanics, Faculty of Civil Engineering in Split, Split, 2006.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Vuković, Ž.: Basics of Hydraulic Engineering (Part One, Book Two), Aquamarine, Zagreb, 1996.	8	50
Gulić, I.: Water Supply, HSGI, Zagreb, 2000.	20	
Margeta, J.: Sewerage of settlements: drainage and disposal of wastewater and rainwater; GF in Split, 2009	10	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Aleksandra Deluka-Tibljaš, Ph.D	
Course	INTRODUCTION TO URBAN ROADS AND INTERSECTIONS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The student is trained to develop a project of city roads and their maintenance. He is familiar with the basic elements of the city's transport infrastructure.

1.2. Conditions for enrolment in courses

Introduction to Road Design – passed

1.3. Expected learning outcomes for the subject

1. Define the properties of different categories of urban roads.
2. Define the properties and analyze the capacities of city intersections in simple conditions.
3. Design a smaller parking lot.
4. Explain the way of construction of city roads and installations in the trunk of the same.

1.4. Content of the course

- Introduction and basic characteristics of the transport system in the city.
- Urban roads: function, division.
- Basic geometric elements of the horizontal and vertical flow of the route of urban roads.
- Specificity of city streets: communal installations, pedestrian areas, public lighting, drainage.
- Basic properties of city intersections.
- Capacitance of city roads and intersections.
- Types and methods of parking, parking areas.
- Garage-parking facilities, types.
- Public transport, functions and features.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☒ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

- Creating a program task
- Periodic examinations
- Field tour
- Final exam

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	1,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

70% during classes (periodic examinations, program assignment), 30% final exam

1.10. Compulsory literature

1. Legac I., City Roads, Faculty of Transport and Traffic Engineering, Zagreb, 2011
2. Legac, I. Intersections of Public Roads, Faculty of Transport and Traffic Engineering, Zagreb, 2008

1.11. Supplement literature

1. Maletin, M.: Planning and Design of Roads in Cities, GF Belgrade, 2005
2. Cerovac, V.: Traffic Technology and Safety; University of Zagreb - Faculty of Transport and Traffic Sciences, Zagreb 2001
3. Štefančić, G. Urban Traffic Technology, Faculty of Transport and Traffic Engineering, Zagreb, 2008.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Legac I., City Roads, Faculty of Transport and Traffic Engineering, Zagreb, 2011	20	50
Legac, I. Intersections of Public Roads, Faculty of Transport and Traffic Engineering, Zagreb, 2008	3	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader		
Course	INTRODUCTION TO LANGUAGE CULTURE	
Study program	**Professional Undergraduate Study of Civil Engineering**	
Course status	**Electoral**	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	2
	Number of hours (L+E+S)	15+15+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The basic objective of the course is to master the basics of linguistic and orthographic norms, both in written and oral expression. Students are especially instructed in the characteristics of the language of the profession and in the way of using certain normative manuals (spelling, grammar, dictionary, language advisor, etc.).

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Mastering the administrative functional style.
2. Facilitating public communication with business partners.
3. Facilitating inclusion in the world of work.
4. Knowledge of the specifics of the language of the profession.
5. Ability to spot specific linguistic dilemmas and resolve them.
6. Mastering the basics of linguistic and orthographic norms.
7. Mastering the basics of linguistic and orthographic norms.

1.4. Content of the course

Language as a system and language as a standard (systemic norms and functional norms); standard language and its norms; realization of standard language and functional styles (stylistic norms); elements of grammatical (morphological, syntactic) and lexical norms; normative manuals (grammars, dictionaries, spellings) and how they are used. Written expression; orthographic (spelling) norm; spelling rules; spelling manuals; computer spelling (spelling-checker) and how to use it; Forms of written expression and structure of the text. Oral expression; orthoepic norm; spoken language values (sentence melody, intonation, sentence stress); sentence as a communicative unit (statement); supersentence unity (text, discourse); the composition of speech; forms of oral expression; rhetoric. Language in the function of the profession; scientific style as one of the functional styles of the standard language; features and intra-stylistic stratifications (professional, popular science, scientific, etc.); professional terminology...

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☐ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Students are required to actively participate in all forms of teaching. They solve practical language tasks independently and in groups. Colloquium.

1.8. Monitoring student work

Attending classes	1	Teaching activity		Seminar paper		Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Activity in class, homework, colloquia (100%).

1.10. Compulsory literature

1. Anić, Vladimir: Dictionary of the Croatian Language, Novi Liber, Zagreb 1998 (or an earlier edition).
2. Anić, Vladimir; Goldstein, Ivo: Dictionary of Foreign Words, Novi Liber, Zagreb 1999.
3. Babić, Stjepan; Finka, Božidar; Moguš, Milan: Croatian Orthography, Školska knjiga, Zagreb 1996.
4. Dictionary of the Croatian Language, ed. Jure Šonje, Institute of Lexicography - Školska knjiga, Zagreb 2000.
5. Škarić, Ivo: Foundations of Contemporary Oratory, Školska knjiga, Zagreb 2000.
6. Težak, Stjepko; Babić, Stjepan: Grammar of the Croatian Language, Školska knjiga, Zagreb 1992.

1.11. Supplement literature

1. Barić, Eugenija et al.: Croatian Grammar, Školska knjiga, Zagreb 1995.
2. Barić, Eugenija et al.: Croatian Language Advisor, Institute of Croatian Language and Linguistics, Pergamena - Školske novine, Zagreb 1999.
3. Batnožić, Slaven; Ranilović, Branko; Silić, Josip: Croatian Computer Orthography (Grammatical-Orthographic Computer Guide), Matica hrvatska - SYS, Zagreb 1996.
4. Brodnjak, Vladimir: Distinctive Dictionary of Serbian and Croatian Language, Školske novine, Zagreb 1991.
5. We Speak Croatian (Language Tips), edited by M. Dulčić, Zagreb 1997

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Anić, Vladimir: Dictionary of the Croatian Language, Novi Liber, Zagreb 1998 (or an earlier edition).	2	50
Anić, Vladimir; Goldstein, Ivo: Dictionary of Foreign Words, Novi Liber, Zagreb 1999.	1	
Babić, Stjepan; Finka, Božidar; Moguš, Milan: Croatian Orthography, Školska knjiga, Zagreb 1996.	6	
Dictionary of the Croatian Language, ed. Jure Šonje, Institute of Lexicography - Školska knjiga, Zagreb 2000.	1	
Težak, Stjepko; Babić, Stjepan: Grammar of the Croatian Language, Školska knjiga, Zagreb 1992.	2	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Iva Mrak, Ph.D	
Course	INTRODUCTION TO DESIGN II	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Knowledge of the role and development of public buildings. Knowledge of the elements and development of design. Knowledge of the approach to the design of different categories of public buildings. Preparation of the conceptual design of a smaller public building and the development of a part of the detailed design using modern construction products and technologies.

1.2. Conditions for enrolment in courses

Introduction to Design I – passed

1.3. Expected learning outcomes for the subject

1. Analyze the basic principles of design.
2. Apply the basic principles of design.
3. To create a cultural (socio-technical) basis for understanding and applying design principles.
4. List the basic characteristics of the historical development of construction, especially public construction.
5. Explain the role of public buildings in the development of space.
6. Explain the role of function, construction and design and their development in public architecture.
7. To list the key people, plans and projects that defined the emergence of a modern approach to design, especially public buildings.
8. List the basic characteristics of buildings according to the type of public building.
9. Specify the specific requirements for public buildings depending on the type of building.
10. Develop a conceptual design for a smaller public building and/or develop a part of the detailed design using modern building structures and technologies characteristic of the construction of public buildings.

1.4. Content of the course

1. Elements of historical development.
2. Approach to the design of public buildings.
3. Basic characteristics of public buildings - function, construction and design: office buildings, production buildings, buildings for education, commercial and catering buildings, buildings for culture and sports, traffic buildings.
4. Specifics of public building design – special requirements for public buildings, technologies, design, design approaches.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☒ Independent tasks ☒ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Compulsory attendance at classes, active classes, examinations, development and collation of the program, final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity	0,5	Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task	2	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Exercises, colloquia and program (70%), exam (30%).

1.10. Compulsory literature

1. Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997
2. Knežević G., Kordiš I.: Residential and Public Buildings, Tehnička knjiga, Zagreb 1984.
3. Neufert: Elements of Architectural Design, Golden Marketing, Zagreb 2002
4. Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.
5. Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.

1.11. Supplement literature

1. Ching, F.D.K.; Eckler, J.F. Architecture: Form, Space, & Order, Wiley, 2014
2. Gehl, J., Life Between Buildings: Using Public Space, Island Press, 2011.
3. National Association of City Transportation Officials, Urban Street Design Guide, Island Press, 2013.
4. Fawcett, A. P., Architecture: Design Notebook, Architectural Press, Oxford, 1998.
5. Production programs of construction products.
6. Oris magazine, Detail...
7. Additional literature according to the topics of lectures recommended during classes.
8. Other sources: www.archdaily.com, europaconcorsi.com, www.greatbuildings.com, www.oma.eu, www.rpbw.com, www.mvrdv.nl, www.miessociety.org, www.fondationlecorbusier.fr ...

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997	1 (13.sv)	50
Knežević G., Kordiš I.: Residential and Public Buildings, Tehnička knjiga, Zagreb 1984.	6	
Neufert: Elements of Architectural Design, Golden Marketing, Zagreb 2002	13	
Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.	6	
Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.	3	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies
Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Iva Mrak, Ph.D	
Course	CONSTRUCTION HISTORY	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	2
	Number of hours (L+E+S)	20+0+10

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The aim of the course is to introduce students to the historical development of construction, with an emphasis on the development of architectural and building structures, for a better understanding of modern structural solutions in architecture and construction.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Distinguish the developmental stages of the history of structures.
2. To list and describe trends in the development of construction.
3. Describe the characteristics of famous historical (and contemporary) buildings and their constructions.
4. Enumerate and describe buildings important for the history of structures in Croatia and River.
5. Create a seminar paper on a given topic.
6. Describe the work, analyze and argue the theses presented in the paper.

1.4. Content of the course

- Introduction; Primitive constructions of the Stone Age; The Bronze Age and early urban cultures;
- Stone structures of ancient Egypt
- Constructions of Greek and Hellenistic culture;
- Ancient Rome and Byzantium;
- Romanesque and Gothic;
- Architecture of Islamic countries;
- Renaissance and Baroque;
- The First Industrial Age – Iron Constructions;
- Second Industrial Age: Steel Structures;
- Second Industrial Age: reinforced concrete structures;
- The Third Industrial Age: Constructions after 1945

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☐ exercises ☐ Distance education ☒ Field Teaching	☒ Independent tasks ☒ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at classes, preparation and defense of seminar papers, colloquium.

1.8. Monitoring student work

Attending classes	1	Teaching activity		Seminar paper	0,5	Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task		Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

100% during classes

1.10. Compulsory literature

1. Radić , J., Introduction to Construction, Školska knjiga, 2016
2. Mohorovičić , A., Construction in Croatia - Architecture and Urbanism, Školska knjiga, 1992
3. Werner, M., Gunther, V., ATLAS OF ARCHITECTURE 2, History of Architecture from the Romanesque to the Present GOLDEN MARKETING, 2000

1.11. Supplement literature

1. Matejčić, Radmila: How to Read the City, ICR Rijeka, 3rd edition Rijeka 1990.
2. Milić, Bruno: The Development of the City through the Centuries I, II and III, Školska knjiga Zagreb 1990-2004.
3. Architecture of Historicism in Rijeka, several authors, MMSU, Rijeka 2001.
4. Art Nouveau Architecture in Rijeka, MGR, several authors, Rijeka 1998.
5. Modern Architecture of Rijeka, MGR, several authors, Rijeka 1996.
6. Grčević, M., Construction Through the Ages, Society of Art Historians of Croatia, 1999.
7. Marasović, T., Architecture of the Early Croatian Age in Dalmatia, Split, Književni krug, 1994.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Radić , J., Introduction to Construction, Školska knjiga, 2016	2	50
Mohorovičić , A., Construction in Croatia - Architecture and Urbanism, Školska knjiga, 1992	3	
Werner, M., Gunther, V., ATLAS OF ARCHITECTURE 2, History of Architecture from the Romanesque to the Present GOLDEN MARKETING, 2000	3	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Prof. Nevenka Ožanić, Ph.D	
Course	HYDRAULIC REGULATIONS AND MELIORATIONS	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

To ensure that within the course students master the basic elements of engineering perception, reasoning and solving hydrotechnical tasks in the domain of regulation and land reclamation structures.

To train students to independently solve basic tasks and calculations in the field of river flow regulation and land reclamation.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Develop a conceptual solution for the regulation of a simpler watercourse (technical description, hydrological and hydraulic calculation, graphic representation of the solution).
2. To develop a conceptual solution for a simpler regulation (technical description, hydrological and hydraulic calculation, graphic representation of the solution).
3. To develop a conceptual solution for a simpler land reclamation building (technical description, hydrological and hydraulic calculation, graphic representation of the solution).
4. To develop a conceptual solution for a simpler irrigation system (technical description, hydrological and hydraulic calculation, graphic representation of the solution).

1.4. Content of the course

Purpose, problems and tasks of watercourse regulation. Morphology of the river flow. Bank. Longitudinal and transverse structures. Regulation structures. Regulation of the water regime. Flood defence. Building materials in regulation. Erosion processes. The basics of the arrangement of the basin. Arrangement of torrents.
Plant-soil-water relationships. Drainage systems. Detailed drainage systems. Construction of drainage systems. Soak. Quality and origin of soaking water. Elements of the irrigation system. Planning and design of irrigation systems.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending lectures and exercises according to the standards of the faculty. Passing the colloquium and final exam.

Development and submission of programs (development of solutions for water flow regulation and/or land reclamation) from exercises, colloquiums.

1.8. Monitoring student work

Attending classes	2	Teaching activity		Seminar paper		Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	1,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Preparation of the program and seminar, attendance at classes, colloquia – 70%, exam – 30%.

1.10. Compulsory literature

1. Gjurović, M.: Regulation of Rivers, Tehnička knjiga Zagreb, 1967.
2. Svetličić, E.: Open Watercourses - Regulation. Faculty of Civil Engineering, University of Zagreb, 1987
3. Kos, Z.: Hydrotechnical Soil Reclamation - Irrigation, Školska knjiga Zagreb, 1987.
4. Kos, Z.: Hydrotechnical Land Reclamation - Drainage, Školska knjiga Zagreb, 1989.

1.11. Supplement literature

1. Chin, A.D.: 2000, Water – Resources Enginnering, Prentice Hall, New Jersey.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Gjurović, M.: Regulation of Rivers, Tehnička knjiga Zagreb, 1967.	1	50
Svetličić, E.: Open Watercourses - Regulation. Faculty of Civil Engineering, University of Zagreb, 1987	2	
Kos, Z.: Hydrotechnical Soil Reclamation - Irrigation, Školska knjiga Zagreb, 1987.	5	
Kos, Z.: Hydrotechnical Land Reclamation - Drainage, Školska knjiga Zagreb, 1989.	7	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	Assoc. Prof. Paulina Krolo, Ph.D	
Course	INTRODUCTION TO STRUCTURAL DESIGN	
Study program	Professional Undergraduate Study of Civil Engineering	
Course status	Electoral	
Year	First	
Credit value and course delivery	ECTS coefficient of student workload	2
	Number of hours (L+E+S)	20+10+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The objectives of the course are to provide students with basic knowledge about the concept of calculation of building structures, the legislative, technical and standardization framework that regulates it, the methodology of meeting the essential requirements for buildings as complex products in construction, taking into account the peculiarities of materials, the type and static system of the structure, the effects on the structure and reliability as a new measure of safety.

1.2. Conditions for enrolment in courses

1.3. Expected learning outcomes for the subject

1. Apply the European standard for the basics of structural design HRN EN 1990
2. Apply the European standard for actions on structures HRN EN 1991
3. Calculate constant load, snow and wind load on a simple structure
4. Calculate the appropriate relevant combination of actions

1.4. Content of the course

- Methodology of calculation of building structures
- Legislative framework (technical and legal framework) and Eurocode system of standards for the design of structures
- Fundamentals of engineering reliability
- Actions on structures
- Boundary states and combinations of actions
- Overview of structural systems, functions of elements and parts of structural systems in accepting the effect on structures

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attending lectures and exercises, creating and submitting a program assignment, taking one colloquium

1.8. Monitoring student work

Attending classes	1	Teaching activity		Seminar paper		Experimental work	
Written exam		Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,5	Report		Practical work	
Portfolio		Program task	0,5	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Class activity, seminar paper, colloquia (100%).

1.10. Compulsory literature

1. Dujmović, Darko; Lukačević, Ivan; Androić, Boris, Design of Structures according to EN 1990: Theory and Numerical Examples Zagreb: IA Projektiranje, 2020

1.11. Supplement literature

1. Handbook_1:_Basis_of_structural_design: Guide to Interpretative Documents for Essential Requireents to EN 1990 and to application and use of Eurocodes (Leonardo da Vinci Pilot project CZ/02/B/F/PP-134007)
2. Handbook 2: Implementation of Eurocodes / Reliability backgrounds: Guides to the basis of structural reliability and risk engineering related to Eurocodes, suplemented by practical examples (Leonardo da Vinci Pilot project CZ/02/B/F/PP-134007)

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Dujmović, Darko; Lukačević, Ivan; Androić, Boris, Design of Structures according to EN 1990: Theory and Numerical Examples Zagreb: IA Projektiranje, 2020	20	50

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader	**Assoc. Prof. Iva Mrak, Ph.D**	
Course	**FINAL WORKS IN ARCHITECTURE**	
Study program	**Professional Undergraduate Study of Civil Engineering**	
Course status	**Electoral**	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+30+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Master the knowledge of the proper use of materials for final works, learn to critically apply the manufacturer's suggestions and details, and independently solve specific tasks.

1.2. Conditions for enrolment in courses

Architectural Structures II - enrolled

1.3. Expected learning outcomes for the subject

1. Specify the types of finishing work.
2. Explain the types of finishing work.
3. Explain the basic building materials and finishing technologies.
4. Use data from manufacturers of construction products.
5. To provide concrete and usable engineering solutions using modern materials and technologies present on the market.
6. Recognize the characteristics of materials and technologies in construction and their roles.
7. Create blueprints and instructions that allow for actual performance.

1.4. Content of the course

Final works, significance and division according to the Ordinance for Final Works in Construction.
Wooden roofs and pitched roof coverings, slopes, types of materials, method of covering.
Construction sheet metal, types of materials, covering details, flashings, expansion joints, drainage.
Flat roofs, types, design, layers of insulation, characteristic details.
Thermal insulation systems of external walls, ventilated façade, façade cladding.
Processing of exterior and interior walls, classic and modern plasters and coatings.
Sound-insulating lightweight partitions, suspended ceilings and cladding.
Floating floors, floor coverings, types, application and method of laying.
Windows and doors, types of materials and constructions, details.
Glazing of external and internal openings with ordinary and special glazing.
Protection from the sun, views, burglary.

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☒ Field Teaching	☒ Independent tasks ☒ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Attendance at classes, active classes, checks, development and colloquial programming. Passing the final exam.

1.8. Monitoring student work

Attending classes	2	Teaching activity	0,25	Seminar paper		Experimental work	
Written exam	0,5	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,25	Report		Practical work	
Portfolio		Program task	1	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Active participation in classes, development and collateralization of the program (70%), exam (30%).

1.10. Compulsory literature

1. Neidhardt, T., Building Structures: Finishing Works and Load-Bearing Systems in Construction, Omega A1, Zagreb, 2004.
2. Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997
3. Peulić, Đ., Constructive Elements of Buildings, Croatia knjiga, Zagreb, 2002.
4. Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.

1.11. Supplement literature

1. Francis D. K. Ching, Building Construction Illustrated, Wiley, New Jersey, USA, 2014.
2. Andrea Deplazes (eds), Constructing Architecture: Materials, Processes, Structures: a Handbook, Darch Eth, 2008.
3. Norms and Standards of Work in Construction, Final Papers, Construction Book Belgrade, 2008.
4. Vrkljan Z.: Equipment of Construction Drawings-Detailed Drawings, Zagreb 1965.
5. Torricelli, M.C., Del Nord, R., Felli, P., Materials and technologies of architecture, Editori Laterza, 2012.
6. Ripamonti, M.E., Dolce, F.C., Thermal bridges, analysis and solution hypotheses. Dario Flaccovio, 2011.
7. Sorić, Z.: Masonry Structures I, Croatian Association of Civil Engineers, Zagreb, 1999.
8. Production programs of construction products.
9. Additional literature according to the topics of lectures recommended during classes.

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Technical Encyclopedia, Miroslav Krleža Institute of Lexicography, Zagreb, 1963-1997	1 (13 vols.)	50
Peulić, Đ., Constructive Elements of Buildings, Croatia knjiga, Zagreb, 2002.	19	
Štulhofer, A. and Veršić, Z.: Drawing Architectural Designs: Accessories and Basics, Zagreb, 1998.	3	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader		
Course	EARTHWORKS	
Study program	**Professional Undergraduate Study of Civil Engineering**	
Course status	**Electoral**	
Year	Second	
Credit value and course delivery	ECTS coefficient of student workload	4
	Number of hours (L+E+S)	30+15+0

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

Develop skills in the development of a road project in the segment of earthworks calculation and the execution of works on the lower structure of the road.

1.2. Conditions for enrolment in courses

Introduction to Road Design – enrolled

1.3. Expected learning outcomes for the subject

1. Differentiate the quality of the material.
2. Explain the technologies of making geotechnical objects.
3. Distinguish between the specifics of work and the machinery used in the given conditions.
4. Elaborate the road project.
5. Calculate the amount of earthworks.
6. Distinguish between road maintenance systems.

1.4. Content of the course

- Material of the lower structure of the road.
- Humus, landscaping of the subsoil.
- Execution of earthworks.
- Mechanization for earthworks.
- Specificity of work in stone material.
- The basics of blasting.
- Notch manufacturing technology.
- Embankment manufacturing technology.
- Slope protection techniques.
- Techniques for improving the foundation soil.
- The ratio of masses, the calculation of lines and the arrangement of earth masses, leveling.
- Road maintenance

1.5. Types of teaching	☒ lectures ☐ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☒ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

Creating a program assignment, written knowledge test.

1.8. Monitoring student work

Attending classes	1,5	Teaching activity		Seminar paper		Experimental work	
Written exam	0,75	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	0,75	Report		Practical work	
Portfolio		Program task	1,0	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

Colloquiums, seminar papers, program tasks (70%), final exam (30%).

1.10. Compulsory literature

1. General Technical Conditions for Road Works, IGH Zagreb, Zagreb, 2001
2. Korlaet, Ž.: Road Design and Construction, Zagreb 2018.
3. Lukić, Č.D.; Anagnosti, P.V.: Geotehnika saobraćajnica; Beograd 2010.

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
General Technical Conditions for Road Works, IGH Zagreb, Zagreb, 2001:	Available online	50
Korlaet, Ž.: Road Design and Construction, Zagreb 2018.	3	
Lukić, Č.D.; Anagnosti, P.V.: Geotehnika saobraćajnica; Beograd 2010.	2	

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

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General information		
Course leader		
Course	RAILWAY ENGINEERING	
Study program	**Professional Undergraduate Study of Civil Engineering**	
Course status	**Electoral**	
Year	Third	
Credit value and course delivery	ECTS coefficient of student workload	5,5
	Number of hours (L+E+S)	30+15+15

1. DESCRIPTION OF THE COURSE

1.1. Course objectives

The aim of the course is to train students to work on the development of projects related to railway infrastructure and the calculation of individual elements.

1.2. Conditions for enrolment in courses

Introduction to Road Design – passed

1.3. Expected learning outcomes for the subject

1. Define the stages of railway development.
2. Distinguish between tracks and trains and define the basic properties of different types of them.
3. Define the elements of the upper and lower structure of the line.
4. Elaborate the elements of the upper and lower structure of the track.

1.4. Content of the course

- Railway as a means of transport
- Historical overview of the railway and development
- Division of tracks and trains
- Cross-section of the line
- Upper and lower structure of the line
- Track construction, rails, sleepers
- Stress calculation, dimensioning of rails, sleepers, curtains and planes
- Railway design, Laying of the railway line, laying of the zero line, technical elements
- Elements of the railway project: situation, longitudinal profile, transverse profiles, technical description
- Management and maintenance of railway infrastructure
- Stations
- Track installations: switches, turntables, expansion joints

1.5. Types of teaching	☒ lectures ☒ seminars and workshops ☒ exercises ☐ Distance education ☐ Field Teaching	☐ Independent tasks ☐ Multimedia & Network ☐ laboratory ☐ Mentoring work ☐ Other_____
1.6. Comments		

1.7. Obligations of students

- Preparation of program tasks and seminars
- Periodic examinations
- Final exam

1.8. Monitoring student work							
Attending classes	2	Teaching activity		Seminar paper	0,25	Experimental work	
Written exam	1	Viva voce		Assay		Research	
Project		Continuous Knowledge Assessment	1	Report		Practical work	
Portfolio		Program task	1,25	Laboratory			

1.9. Procedure and examples of assessment of learning outcomes during classes and at the final exam

70% during classes, 30% final exam

1.10. Compulsory literature

1. Marušić, D.: Design and Construction of Railway Lines, GF Split, Split, 1994

1.11. Supplement literature

1.12. Number of copies of compulsory literature in relation to the number of students currently attending classes in the course

Title	*Number of copies*	*Number of students*
Marušić, D.: Design and Construction of Railway Lines, GF Split, Split, 1994.	8	50

1.13. Methods of quality assurance that ensure the acquisition of learning outcomes, skills, and competencies

Quality monitoring procedures prescribed by the Faculty Quality Manual are carried out.

3.3. STRUCTURE OF STUDY, RHYTHM OF STUDY, ENROLMENT REQUIREMENTS

3.3.1. Structure of Studies, Courses and Lecturers

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LIST OF MODULES/COURSES							
Year: The first							
	COURSE	PROFESSOR	L	E	S	ECTS	STATUS
1. semester – **winter**	Physics	Prof. Boris Podobnik, Ph.D	30	15	0	4	C
	Geodesy	Andrej Marinović, lecturer	30	15	0	4	C
	Geometric Graphics I	Maura Jurić, senior lecturer	15	0	30	3,5	C
	Engineering Informatics	Assoc. Prof. Neira Torić Malić, Ph.D	15	30	0	3,5	C
	Mathematics I	Assoc. Prof. A. Perušić Pribanić, Ph.D	30	30	0	6,5	C
	Computer Applications	Maura Jurić, senior lecturer	5	40	0	3,5	C
	Technical Mechanics I	Asst. Prof. Sara Grbčić Erdelj, Ph.D; Asst. Prof. Teo Mudrić, Ph.D	30	30	0	4,5	C
	Physical Education (1/2)	Tomislav Uzelac-Šćiran, Ph.D, lecturer	0	15	0	0,5	C
2. Semester – **summer**	Architectural Structures I	Assoc. Prof. Iva Mrak, Ph.D	30	30	0	5	C
	Geometry Graphics II	Maura Jurić, senior lecturer	15	0	15	3,5	C
	Civil Engineering Materials	Assoc. Prof. Silvija Mrakovčić, Ph.D; Assoc. Prof. Natalija Bede Odorčić, Ph.D	30	30	0	5	C
	Mathematics II	Assoc. Prof. A. Perušić Pribanić, Ph.D	30	15	0	5	C
	Technical Mechanics II	Assoc. Prof. Emina Hadžalić, Ph.D; Asst. Prof. Teo Mudrić, Ph.D	30	30	0	5,5	C
	Physical Education (2/2)	Tomislav Uzelac-Šćiran, Ph.D, lecturer	0	15	0	0,5	C
	English Language	Saša Čohar Mančić, senior lecturer	30	0	15	3,5	E
	German Language	Saša Čohar Mančić, senior lecturer	30	0	15	3,5	E
	Sustainable Urban Transport Infrastructure	Prof. A. Deluka-Tibljaš, Ph.D; Prof. Barbara Karleuša, Ph.D; Assoc. Prof. Silvija Mrakovčić, Ph.D	20	15	10	3	E
	Introduction to Language Culture		15	15	0	2	E
	Construction History	Assoc. Prof. Iva Mrak, Ph.D	20	0	10	2	E
	Introduction to Structural Design	Assoc. Prof. Paulina Krolo, Ph.D	20	10	0	2	E

LIST OF MODULES/COURSES

Year: 2nd

	COURSE	PROFESSOR	L	E	S	ECTS	STATUS
3. semester – **winter**	Architectural Structures II	Assoc. Prof. Iva Mrak, Ph.D	30	30	0	4	C
	Introduction to Road Design	Asst. Prof. Marijana Cuculić, Ph.D	30	30	0	4,5	C
	Timber Structures	Prof. Adriana Bjelanović, Ph.D	36	24	0	5,5	C
	Basics of Concrete and Masonry Structures	Assoc. Prof. Željko Smolčić, Ph.D	30	30	0	5,5	C
	Applied Geology	Asst. Prof. Petra Jagodnik, Ph.D	20	10	0	2,5	C
	Construction Technology	Prof. Ivan Marović, Ph.D	30	15	0	3,5	C
	Hydraulic Structures	Assoc. Prof. Goran Volf, Ph.D	30	30	0	5,5	C
4. Semester – **summer**	Geotechnical Engineering	Assoc. Prof. Sanja Dugonjić Jovančević, Ph.D	30	20	0	4,5	C
	Civil Engineering Regulations	Prof. Ivan Marović, Ph.D	30	0	0	2	C
	Construction Management	Prof. Ivan Marović, Ph.D	45	30	0	6,5	C
	Introduction to Design I	Assoc. Prof. Iva Mrak, Ph.D	30	30	0	4	C
	Introduction to Spatial Planning	Bojan Bilić, senior lecturer	30	0	15	4	C
	THE DIRECTION OF CIVIL ENGINEERING						
	Bridges	Prof. Ivana Štimac Grandić, Ph.D	30	15	0	4	C/E
	Earthworks		30	15	0	4	C/E
	THE DIRECTION OF HIGH-RISE CONSTRUCTION						
	Installations	Assoc. Prof. Bojana Horvat, Ph.D	30	25	0	4	C/E
	Final Work in Architecture	Assoc. Prof. Iva Mrak, Ph.D	30	30	0	4	C/E

LIST OF MODULES/COURSES

Year: Third

	COURSE	PROFESSOR	L	E	S	ECTS	STATUS
5. semester – **winter**	Construction Economics	Asst. Prof. Ksenija Tijanić Štrok, Ph.D	30	30	0	5	C
	Environmental Protection	Assoc. Prof. Leo Matešić, Ph.D	15	0	15	3	C
	THE DIRECTION OF CIVIL ENGINEERING						
	Coastal Structures	Prof. Igor Ružić, Ph.D	30	30	0	5,5	E
	Water Supply and Sewerage	Assoc. Prof. Goran Volf, Ph.D	30	30	0	5,5	E
	Introduction to Urban Roads and Intersections	Prof. Aleksandra Deluka-Tibljaš, Ph.D	30	30	0	5,5	E
	Hydraulic Regulations and Meliorations	Prof. Nevenka Ožanić, Ph.D	30	30	0	5,5	E
	Railway Engineering		30	15	15	5,5	E
	THE DIRECTION OF HIGH-RISE CONSTRUCTION						
	Concrete and Masonry Structures	Assoc. Prof. Željko Smolčić, Ph.D	30	30	0	5,5	E
	Steel Structures	Assoc. Prof. Paulina Krolo, Ph.D	30	30	0	5,5	E
	Prefabricated Structures	Asst. Prof. Paulo Šćulac, Ph.D	30	20	10	5,5	E
	Water Supply and Sewerage	Assoc. Prof. Goran Volf, Ph.D	30	30	0	5,5	E
	Introduction to Design II	Assoc. Prof. Iva Mrak, Ph.D	30	30	0	5,5	E
6. Sem. – **summer**	Vocational Practice	Asst. Prof. Ksenija Tijanić Štrok, Ph.D	0	360	60	15	C
	Final Year Project		0	0	60	15	C

3.3.2. The Rhythm of Studying

The rhythm of studying is visible from the table in point 3.3.1 where the Structure of the study program is presented.

3.3.3. Student obligations

The obligations of students are defined by the applicable regulations, especially the Ordinance on Studies of the University of Rijeka and the curricula of the courses envisaged by the program (in point 3.2.1. Course Description).
Special obligations will be defined by the Faculty Regulations on Studies.

3.3.4. Conditions for enrollment in the next semester

According to Article 36. of the Ordinance on Studies of the University of Rijeka:

'Article 36
Progression through study

(1) A full-time student enrolls in courses worth 60 ECTS credits in each academic year, and a part-time student enrolls in courses worth at least 30 ECTS credits.

(2) A full-time student who has not earned the enrolled ECTS credits in the academic year is obliged to re-enrol in the same courses in the new academic year and, in accordance with the study programme, the difference in courses up to 60 ECTS credits, and a part-time student is obliged to re-enrol in the same courses up to at least 30 ECTS credits (with a permitted deviation during the study of a total of 5% of the minimum number of ECTS credits in the study programme).

(3) A student has the right and obligation to enrol in a course in which he or she has not earned the enrolled ECTS credits, taking into account that the total duration of study may not exceed twice the duration determined by the study programme.

(4) A student who has earned all 60 ECTS credits in the academic year may be approved for accelerated study in the manner and in accordance with the conditions prescribed by the study program."