

**Semester 1****Compulsory courses**

Sanja Lađarević dipl.ing.arh.	Building Elements I	ECTS:7
Sanja Lađarević dipl.ing.arh. mr.sc. Miroslav Magerle dipl.ing.građ mr.sc. Donka Wurth predavač	Construction Materials	ECTS:5
dr. sc. Tin Perkov dipl. ing. mat.	Mathematics I	ECTS:7
Mirela Katić-Žlepalo prof.mat.	Descriptive Geometry in Civil Engineering I	ECTS:3
dr.sc. Dražen Arbutina dipl.ing.arh.	Historical Development of Civil Engineering	ECTS:2
mr.sc. Zorislav Despot dipl.ing.građ	Engineering Mechanics	ECTS:6
Natalija Špehar viši predavač	Physical Education I	ECTS:1

**Semester 2****Compulsory courses**

Sanja Lađarević dipl.ing.arh.	Building Elements II	ECTS:5
prof.vis.šk. Ivica Levanat	Physics	ECTS:5
dr. sc. Tin Perkov dipl. ing. mat.	Mathematics II	ECTS:7
Mirela Katić-Žlepalo prof.mat.	Descriptive Geometry in Civil Engineering II	ECTS:3
dr.sc. Tatjana Vlahović prof.v.škole	Elementary Geology	ECTS:2
mr.sc. Zorislav Despot dipl.ing.građ	Structural Design	ECTS:6
mr.sc. Slavko Belić dipl.soc	Sociology of Work	ECTS:2
Natalija Špehar viši predavač	Physical Education II	ECTS:1



Semester 3		
Compulsory courses		
dr.sc. Igor Gukov , dipl.ing.građ.	Concrete Structures I	ECTS:5
prof.vis.šk. Boris Baljkas	Wooden Structures	ECTS:5
Zdravko Kapović dr.sc. Đuro Barković dip.ing.geod.	Geodesy	ECTS:2
dr.sc. Sonja Zlatović , prof.v.šk.	Soil Mechanics	ECTS:5
prof.vis.šk. Boris Baljkas	Steel Structures	ECTS:5
dr.sc. Mladen Petričec dipl.ing.građ.	Introduction to Hydrology and Hydraulics	ECTS:4
Natalija Špehar viši predavač	Physical Education III	ECTS:1
dr.sc. Nenad Mikulić izv.prof.	Environmental Protection	ECTS:2
Elective courses		
dr.sc. Ivana Špiranec viši pred.	English Language I	ECTS:2
Lidija Tepeš Golubić pred.	German Language I	ECTS:2



Semester 4		
Compulsory courses		
dr.sc. Damir Pološki dipl.ing.građ.	Public Roads I	ECTS:5
dr.sc. Sonja Zlatović , prof.v.šk.	Geotechnical Engineering	ECTS:5
mr.sc. Petar Adamović prof.v.škole prof.dr.sc. Zdravko Linarić dipl.ing.građ.	Construction Machinery	ECTS:4
Boris Uremović dipl.ing.građ.	Field Practice	ECTS:2
Natalija Špehar viši predavač	Physical Education IV	ECTS:1
dr.sc. Dražen Arbutina dipl.ing.arh.	Introduction to Physical Planning	ECTS:1
dr.sc. Dražen Arbutina dipl.ing.arh.	Introduction to Urban Planning	ECTS:1
Željko Pavlin dipl.ing.građ.	Introduction to Hydraulic Structures	ECTS:2
Elective courses		
dr.sc. Ivana Špiranec viši pred.	English Language II	ECTS:5
Lidija Tepeš Golubić pred.	German Language II	ECTS:5
Compulsory courses - Civil Engineering (Water and traffic infrastructure)		
dr.sc. Mladen Petričec dipl.ing.građ.	Hydrology and Hydraulics	ECTS:5
Compulsory courses - Civil and Environmental Engineering		
dr.sc. Mladen Petričec dipl.ing.građ.	Hydrology and Hydraulics	ECTS:5
Compulsory courses - Building Construction		
dr.sc. Igor Gukov , dipl.ing.građ.	Concrete Structures II	ECTS:5
Compulsory courses - Management in Civil Engineering		
mr.sc. Časlav Dunović , viši predavač	Market and Business Environment	ECTS:5



Semester 5		
Compulsory courses		
mr.sc. Petar Adamović prof.v.škole	Construction Management I	ECTS:5
Boris Uremović dipl.ing.građ. prof.dr.sc. Vjeran Mlinarić dipl.ing.građ	Construction Technology	ECTS:5
Compulsory courses - Civil Engineering (Water and traffic infrastructure)		
dr.sc. Damir Pološki dipl.ing.građ.	Public Roads II	ECTS:5
Stjepan Kordek dipl.ing.građ.	Water Supply and Sewerage I	ECTS:4
mr.sc. Ante Goran Bajić viši predavač	Introduction to Railways	ECTS:2
Danko Biondić	Regulation and Amelioration Drainage	ECTS:5
Marko Pršić Željko Pavlin dipl.ing.građ.	Hydraulic Structures	ECTS:4
Compulsory courses - Civil and Environmental Engineering		
Zlatko Milanović	Waste Management	ECTS:5
dr.sc. Slavko Šobot	Water Quality	ECTS:5
mr.sc. Gorana Ćosić-Flajsig viši predavač	Water Use	ECTS:5
mr.sc. Gorana Ćosić-Flajsig viši predavač	Water Pollution Control	ECTS:5
Compulsory courses - Building Construction		
Ivan Cetinić dipl.ing.str.	Building Installations I	ECTS:4
prof.vis.šk. Boris Baljkas	Prefabricated Structures	ECTS:5
mr.sc. Ante Goran Bajić viši predavač	Introduction to Railways	ECTS:2
Sanja Lađarević dipl.ing.arh. Sanja Lađarević dipl.ing.arh.	Finishing Works	ECTS:5
Jagoda Bodić dipl.ing.arh.	Building Engineering I	ECTS:4
Compulsory courses - Management in Civil Engineering		
mr.sc. Slavko Belić dipl.soc	Methodology and Management in Civil Engineering	ECTS:2
mr.sc. Petar Adamović prof.v.škole	Organization of Construction Site	ECTS:6



prof.dr.sc. Zdravko Linarić dipl.ing.građ.		
mr.sc. Ante Goran Bajić viši predavač	Introduction to Railways	ECTS:2
Željko Tintor	Conduct of Company Business Operations	ECTS:5
mr.sc. Petar Adamović prof.v.škole	Project Management and Legislation	ECTS:5



Semester 6		
Compulsory courses		
mr.sc. Petar Adamović prof.v.škole	Construction Management II	ECTS:5
Compulsory courses - Civil Engineering (Water and traffic infrastructure)		
mr.sc. Gorana Ćosić-Flajsig viši predavač	Water Supply and Sewerage II	ECTS:2
mr.sc. Petar Adamović prof.v.škole	Final Thesis with Field Practice	ECTS:17
mr.sc. Ante Goran Bajić viši predavač	Railways	ECTS:6
Compulsory courses - Civil and Environmental Engineering		
Željko Koren	Transport and Environment	ECTS:2
dr.sc. Mladen Petričec dipl.ing.građ.	River Engineering	ECTS:5
mr.sc. Petar Adamović prof.v.škole	Final Thesis with Field Practice	ECTS:18
Compulsory courses - Building Construction		
Ivan Cetinić dipl.ing.str.	Building Installations II	ECTS:4
mr.sc. Petar Adamović prof.v.škole	Final Thesis with Field Practice	ECTS:17
Jagoda Bodić dipl.ing.arh.	Building Engineering II	ECTS:4
Compulsory courses - Management in Civil Engineering		
mr.sc. Časlav Dunović , viši predavač	Planning Methods	ECTS:5
mr.sc. Petar Adamović prof.v.škole	Final Thesis with Field Practice	ECTS:20



Code WEB/ISVU	18521/22340	ECTS	7	Type	
Name	Building Elements I				
Status	1st semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				45+166 (9+0+0+121+36)
Teachers	Sanja Lađarević dipl.ing.arh., Nositelj predmeta, Ivana Hari dipl.ing.grad., Ivana Hari dipl.ing.grad., Sanja Lađarević dipl.ing.arh., Sanja Lađarević dipl.ing.arh., Mira Macarol Petrinjak , Mira Macarol Petrinjak , Filip Pintarić , Filip Pintarić , Željko Sušić dipl.ing.arh., Željko Sušić dipl.ing.arh., Željko Sušić dipl.ing.arh., Iva Ževrnja , Iva Ževrnja ,				
Course objectives	Students are expected to acquire basic knowledge on various building elements including materials, structures and construction methods. Building physics.				
Knowledge and competences	After completion of this course, students will gain knowledge and skills necessary for competent participation in the construction process as well as in elaboration of design documents for buildings.				
Values:	-				
How lectures are held	Building elements, materials, structures and construction methods are explained through the drawing process and by using finished drawings of individual elements and details. To facilitate comprehensions of course material and enhance a sense of graphical expression, students are required to produce drawings relating to lectures. Building physics: Specialized professionals will give lectures (15+15) at the end of the first semester.				
How construction exercises are held	Elaboration of graphical (numerical) assignments with the assistance of lecturer when needed.				
Course contents lectures	Introduction, notion of a building, structural elements of buildings (4). Foundations, waterproofing as protection against ground water and moisture (6). Vertical structural elements presented by materials (2). Walls made of brick, stone, wood, concrete blocks, lightweight concrete, monolithic concrete. Partitions and multilayered walls (8). Traditional and modern types of formwork (2). Mortars and plasters (2). Openings in walls (2). Chimneys and ventilation ducts (4). Horizontal structural elements (2). Lightweight and massive structures, construction technology, monolithic, prefabricated and semi-prefabricated columns (8). Roof structures, hipped roofs (8). Flat roofs (4). Stairs: reinforced-concrete, monolithic and prefabricated stairs, wooden and steel stairs (8). Building physics: Introduction, heat transfer. Thermal conductivity, values of heat transfer coefficients (k). Heat accumulation (5). Water vapour condensation. Thermal bridges. Water vapour diffusion. Glaser's calculation method. Temperature variations and temperature stresses (5). Properties of sound. Noise. Sound waves, absorption, time of response. Transfer of airborne sound and impact sound. Insulation (5).				
Course contents auditory	Design report preparation phases; content and presentation of each phase. Instructions for preparation of drawings and guidelines for solving numerical problems (15).				
Course contents constructs	Each student is to prepare a residential building design report, with detailed presentation of all design stages. 1) Preliminary design, final design (12). 2) Working design (ground plan) (12). 3) Working design (basement plan) (8), 4) Working design (roof plan and roof cross section) (8), 5) Working design (cross section) (8) Building physics: Each student is to prepare a numerical example for calculation of building physics properties of a multilayered external wall (12).				
Exam literature	Basic literature: 1. M. Smoljanović: Lecture offprints. 2. Đ. Peulić: Structural elements of buildings I and II, Tehnička knjiga, Zagreb, 1980. 3. Z. Vrkljan, I. Kordiš: Presentation of construction drawings, Faculty of Civil Engineering, Zagreb, 1982. 4. V. Šimetin: Structural physics (lecture notes), Građevinski institut, Zagreb, 1983. Additional literature: 1. Heinrich Schmitt: Hochbaukonstruktion 2. Martin Mittag: Civil engineering structures.				
Knowledge evaluation	Assignments (5 drawings + solution to a building physics numerical problem) - requirements for lecturer's signature Preliminary examinations: 1) Building Physics (obligatory); 2) 1 in the first semester + 2 in the second semester (not obligatory; however those who pass them are not required to take the written portion of the final examination) Final examination - written and oral (to be taken at the end of the academic year). Written part of the examination: presentation of knowledge through drawing; oral part of the examination: verifying comprehension of the subject-matter taught during the course.				
Remark	Possible preparation of the final paper				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18522/22341	ECTS	5	Type	
Name	Building Elements II				
Status	2nd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+121 (6+0+0+91+24)
Teachers	Sanja Lađarević dipl.ing.arh., Nositelj predmeta, Sanja Lađarević dipl.ing.arh., Sanja Lađarević dipl.ing.arh., Mira Macarol Petrinjak , Mira Macarol Petrinjak , Filip Pintarić , Filip Pintarić , Iva Ževrnja , Iva Ževrnja ,				
Course objectives					
Knowledge and competences					
Values:	- - - -				
Prerequisites:	Students cannot enroll in this course unless they have completed Building Elements I Students cannot pass this course unless they have passed Building Elements I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18568/22383	ECTS	4	Type	
Name	Building Engineering I				
Status	5th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+90 (4+0+6+60+20)
Teachers	Jagoda Bodić dipl.ing.arh., Nositelj predmeta, Jagoda Bodić dipl.ing.arh., Jagoda Bodić dipl.ing.arh., Iva Ževrnja , Iva Ževrnja ,				
Course objectives	Acquirement of practical knowledge for employment in design offices and construction companies and for provision of supervision services.				
Knowledge and competences	Design work and realization of construction projects.				
Values:	-				
How lectures are held	During presentation of theoretical lectures appropriate teaching aids (projectors) are used in combination with drawings on the blackboard. Students are required to make their own drawings so as to develop the sense of graphical expression.				
How auditory exercises are held	Instructions for the preparation of the assignment and seminar paper. Analysis of exemplary student work prepared in previous years.				
How construction exercises are held	Independent preparation of the assignment, with corrections as necessary.				
Course contents lectures	: Introduction, problems and significance of the design of residential buildings (2). Economic, historical and sociological influences on the programming, design, construction and use of residential buildings (2). Architectural barriers. Traditional and industrial construction methods. Technical documentation and the building law (2). Solution of individual functions and functional groups in housing (10). Family houses, detached houses, semi-detached houses, and row houses - examples and analyses (14). Typology of residential buildings, functional structures, spatial analyses and examples (14).History of modern building practice and renowned creators of international and Croatian architecture:Influence of engineering structures on the development of modern construction industry (4). Adolf Loos and his significance (2). Novel concepts in concrete work (2). Significance of Chicago school (2). Bauhaus - significance and influence (2). Theoreticians and reformers of modern architecture (2). Organic architecture (2).				
Course contents auditory	Presentation of regulations and standards, and instructions for the preparation of assignments and seminar work (8).				
Course contents constructsures	Independent elaboration of the first assignment : family house - preliminary design, final design, and working design, with corrections (23)Independent elaboration of the second assignment: residential building - preliminary design, final design, and working design, with corrections (23)				
Exam literature	Basic:oP. Madiraca, J. Bodić: Lecture Offprints.oG. Knežević, I. Kordiš: Residential and public buildings (5th edition), Tehnička knjiga, Zagreb, 1981 (Offprints).oG. Knežević: Residential Buildings, Tehnička knjiga, Zagreb, 1986.oW. Mller, G. Vogel: Atlas of Architecture II; Institut građevinarstva Hrvatske, Zagreb, 1997 (Offprints).Additional:oJ. Fiedler, P. Feierabend: Bauhaus, Knemann, 1999 (Offprints).oP. Gssel, G. Leuthauser: Architecture in the Twentieth Century, Benedikt Taschen, 1991 (Offprints).oG.H. Baker: Le Corbusier, An Analysis of Form, E FN SPON.04.B.B. Pfeiffer: Frank Lloyd Wright. Benedikt Taschen, 1991.				
Knowledge evaluation	The examination is formed of two parts - written and oralWritten part of the examination: verification of knowledge by drawings and text.Oral part of the examination: 50% - verification of theoretical knowledge, 50% grade for seminar paper				
Remark	Preparation of final paper is possible				
Prerequisites:	Students cannot enroll in this course unless they have completed Concrete Structures II Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Building Elements II Students cannot enroll in this course unless they have passed Construction Materials				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18569/22384	ECTS	4	Type	
Name	Building Engineering II				
Status	6th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+90	(4+0+6+60+20)
Teachers	Jagoda Bodić dipl.ing.arh., Nositelj predmeta, Jagoda Bodić dipl.ing.arh., Jagoda Bodić dipl.ing.arh., Jagoda Bodić dipl.ing.arh., Iva Ževrnja , Iva Ževrnja , Iva Ževrnja ,				
Course objectives					
Knowledge and competences					
Values:	- - - - - -				
Prerequisites:	Students cannot enroll in this course unless they have completed Building Engineering I Students cannot pass this course unless they have passed Building Engineering I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18570/22385	ECTS	4	Type	
Name	Building Installations I				
Status	5th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+91 (15+0+0+76+0)
Teachers	Ivan Cetinić dipl.ing.str., Nositelj predmeta, Ivan Cetinić dipl.ing.str., Ivan Cetinić dipl.ing.str., Husein Jašarević , Husein Jašarević ,				
Course objectives	Study of water supply and drainage installations, fire installations, and gas installations in buildings from the aspect of function, position within the building, space required, and compatibility with modern solutions and building technologies. Definition of conditions influencing architectural and structural solutions for buildings. Study of thermo-technical installations (heating, cooling, ventilation and air conditioning), gas installations, electrical installations (lighting, electro-mechanical plants, lightning installations, telephone, aerial systems) and vertical transport installations in buildings, from the aspect of function, position within the building, space required, and compatibility with modern solutions and building technologies.				
Knowledge and competences	Students will acquire an appropriate knowledge about systems and elements of installations/services which ensure functioning (use) of various types of buildings. The knowledge acquired during this course will help future engineers to make good decisions during realization of building projects, and this from the aspect of construction work and use of construction technologies. Through knowledge and skills to be gained during this course, students will be able to work after graduation as associate designers and will be able to participate in this capacity in the design, construction and supervision of water engineering projects.				
Values:	-				
How lectures are held	A comprehensive overview of water supply and drainage installations, fire protection installations, and gas installations, is presented orally and through a variety of multimedia aids, including drawings and slides showing installations and installation assemblies on building projects, from the planning stage, to design and to construction work. Thermo-technical installations, gas installations and electricity installations are presented orally and through a variety of multimedia aids, including drawings and slides showing installations and installation assemblies on building projects, from the design to construction work.				
How construction exercises are held	The academic program is implemented through required presentation of a multistorey residential building with more than six housing units. In the first semester, the exercises focus on water supply installations (hot and cold water), sewerage installations (faecal water and other sewage), fire protection installations (external and internal hydrant networks) and gas installations. The second semester is reserved for heating installations, ventilation, gas installations and electricity installations. The selection and dimensioning of the heating, ventilation, gas and lighting systems; presentation of installations in form of plan views and diagrams. Installations are selected, dimensioned and presented in form of plan views and diagrams. After the fifth semester, students will justify the solution adopted for water and gas installations. The solution is justified during submittal of the assignment.				
Course contents lectures	1. Supply and possible sources of sanitary drinking water. Consumption estimate (2).2. Water supply diagrams; function, materials and realization of individual elements and assemblies; water consumption measurement (2).3. Individual and central systems for hot water generation; types of power sources; solar energy in hot water preparation (2).4. Basic diagrams, size of device and its elements; space for building installations; installation of various sun collector types (2).5. Hot water generation design; dimensioning the water supply piping network; selection and types of pressure boosting systems (2).6. Water based fire protection systems for buildings; basic principles, function, materials and realization of individual elements and assemblies (2).7. Automatic fire protection systems based on gas FM 200; fire detection systems; anti-burglary and monitoring systems (2).8. Relevant legislation; external and internal hydrant networks; automatic sprinkler systems; fire fighting by gas and foam (2).9. Types of sewage and sewerage systems; typical diagram presentations; function, materials and realization of individual elements and assemblies (2).10. Sanitary objects and devices; ergonomic use of space; prefabricated elements; sanitary block walls and cabins (2).11. Types of waste water purification devices; separators of oil, grease and petrol; intercepting pits and septic tanks; biodisk (2).12. Sewerage piping design; equivalent factor method (DIN 1986); calculation method according to K2).13. Gas types and uses; gas installation diagram; function, materials and realization of individual elements and assemblies (2).14. Types of energy-using devices, installation requirements; types and dimensioning of gas chimneys (2).15. Relevant legislation. Dimensioning of gas installations (2).1. Hygienic elements of thermo-technical installations; external climate requirements; climate zones; external temperatures; wind patterns (2).2. Methodology for the calculation of the heat inflow and heat loss; influence and the way in which heat loss can be reduced; approximative methods (2).3. Historic development of heating; classification; sources of heat; basic installation diagrams; calculation of heat installation elements (2).4. Types of heating bodies, material, installation method, required space, determination of location, calculation (2).5. Natural ventilation, solutions and principles of natural ventilation; mechanical ventilation; principal diagrams (2).6. Ventilation system elements, their function, position, material, heat regain, noise and solutions for its abatement (2).7. Air conditioning: classification of systems; basic diagrams, elements, function, position, method and place of installation (2).8. Refrigeration plants, operating principles, thermal pumps and possibilities for using recoverable sources of energy (2).9. Refrigeration; historic development, SPLIT systems, their development and use; VRV systems, their development and use (2).10. Electricity installations; strong and weak current; principal diagrams, connections, distributions and measurements, spare generator (2).11. Types of light sources; artificial light; solutions for implementation of calculation methodologies (2).12. Telephone installation; DTK network, basic diagrams, links to information science; central supervisory system (2).13. Audio-video installations; lightening arrester installations; function, material, elements, position, realization (2).14. Types and dimensioning of				



	lifts, solutions and location of lift machine room, moving sidewalks and moving steps (2).15. Information on special installations; medical gases, gases for welding and cutting, swimming pool technique (2).
Course contents constructures	1. Calculating hot water and cold water for fire protection (l/s), connection dimensioning (2)2. Calculating pressure at the most unfavourable outlet and hydrant (selection of a pressure boosting device) and corrections (2).3. Calculating and dimensioning hot water systems, with corrections (2).4. Drawing water installations - plan views and diagrams (distribution, verticals, water meters, hydrants, water-meter chamber, gauging station, water heater installation, etc.), and corrections (6).5. Calculating waste water and dimensioning connection to external sewage network, with corrections (2).6. Drawing sewer installations - plan views and diagrams (distribution network, verticals, sanitary fixtures and accessories, longitudinal profile of the evacuation system, manholes, etc.), with corrections (6).7. Drawing details of sanitary areas with water and sewage distribution network and with levels of connections, with corrections (2).8. Calculating quantity of gas and connection dimensioning; drawing installations in plan view (distribution network, verticals, consumers, gas meters), with corrections (2)9. Drawing installations - diagrams and details (non-measured and measured gas installations, chimney connection detail), with corrections (4).1. Determining heat transfer coefficient for all structural elements (in accordance with prevailing regulations) (2).2. Calculating heat loss and heating bodies for a given apartment, with corrections (2).3. Calculating heat loss for an entire building, assuming that the building is a single space with a uniform temperature, with corrections (4).4. Calculating boiler room elements: boilers, chimney, fuel shed, expansion vessel, with corrections (2).5. Drawing functional diagrams and plan view for a boiler room, with corrections (2).6. Drawing installations - plan views and diagrams (distribution network, verticals, radiators, meters), with corrections (6).7. Calculating and drawing ventilation installations for kitchens, bathrooms and toilets - plan views and diagrams, with corrections (4).8. Calculating lighting of an apartment, with corrections (2).9. Drawing electricity installations - plan views and diagrams (apartment switchboard, light fixtures, sockets, EMP, telephone and aerials, floor dividers with electricity meters, signals; main switchboard, house connection, installation diagram for electricity, aerials and telephone systems), with corrections (6).10. Verification and acceptance of assignments (2).
Exam literature	Basic literature:1. Cetinić I.: Water Supply, work material - lecture notes with exercises.2. Cetinić I.: Sewerage, work material - lecture notes with exercises.3. Cetinić I.: Gas installations, work material - lecture notes with exercises.4. Cetinić I.: Heating, work material - lecture notes.5. Cetinić I.: Refrigeration, ventilation and air conditioning, work material - lecture notes with exercises.6. Cetinić I.: Electricity installations, work material - lecture notes with exercises.7. Cetinić I.: Heating and Electricity Installations, work material - lecture notes with exercises.Additional literature:1. Radonjić M.: Water Supply and Drainage Systems in Buildings, Croatiaknjiga, 2004.2. Tušar B.: House Sewerage, Građevinski fakultet, 2001.3. Tušar B.: Waste Water Evacuation and Purification, Croatiaknjiga, 2004.4. Tadić D.: House installations, BGZ, Belgrade, 1963.5. Strelec et al.: Gas Services Manual, Energetika marketing, Zagreb, 2001.6. Recknagel, Sprengel, Schramek: Manual for Heating, Refrigeration, Ventilation and Air Conditioning, V. Banja, 2002.7. Labudović et al.: Ventilation and Air Conditioning Manual, Energetika marketing, Zagreb, 2000.8. Podlipnik B.: Lighting Manual, Elektrovina, Maribor, 1978.
Knowledge evaluation	Assignment verification, Written and oral examination: written part of the examination consists of ten questions; oral examination may be taken by students that obtained at least 60 percent of points during the written part of the examination.
Remark	Preparation of final paper is possible.
Prerequisites:	Students cannot enroll in this course unless they have completed Concrete Structures II Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Building Elements II Students cannot enroll in this course unless they have passed Construction Materials
Proposal made by	(09.05.2005)



Code WEB/ISVU	18577/39177	ECTS	4	Type	
Name	Building Installations II				
Status	6th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+91	(0+0+0+61+30)
Teachers	Ivan Cetinić dipl.ing.str., Nositelj predmeta, Ivan Cetinić dipl.ing.str., Ivan Cetinić dipl.ing.str., Husein Jašarević , Husein Jašarević ,				
Course objectives					
Knowledge and competences					
Values:	-				
Prerequisites:	Students cannot enroll in this course unless they have completed Building Installations I Students cannot pass this course unless they have passed Building Installations I				
Proposal made by	()				



Code WEB/ISVU	18533/22348	ECTS	5	Type	
Name	Concrete Structures I				
Status	3rd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+121 (9+0+0+91+21)	
Teachers	dr.sc. Igor Gukov , dipl.ing.grad., Nositelj predmeta, dr.sc. Igor Gukov , dipl.ing.grad., dr.sc. Igor Gukov , dipl.ing.grad.,				
Course objectives	After completion of this course, students will have acquired appropriate theoretical and practical knowledge about concrete structures.				
Knowledge and competences	Dimensioning reinforced-concrete cross sections for all cases of internal force action; Dimensioning reinforced concrete members for various cases of load according the theory of second order.				
Values:	-				
How lectures are held	Lectures are presented orally, using appropriate technical aids. Design models are presented and used to explain physical states. During lectures, students are asked relevant questions so as to motivate them to think and to make decisions similar to those to be made in their future work.				
How auditory exercises are held	Students are prepared for the preparation of the program. Individual portions of the program are shown on selected examples, with a particular emphasis on the dimensioning and elaboration of bending schedule.				
How construction exercises are held	Students prepare programs and are assisted in this task by the lecturer.				
Course contents lectures	Introduction to concrete structures. Introduction to reinforced concrete (2). Advantages and shortcomings of reinforced concrete. Physicomechanical properties of concrete and steel. Strength of concrete and reinforcement (2). Requirements for composite reinforcement-concrete action. Reinforcement anchoring (2). Dimensioning reinforced-concrete structures according to the ultimate bearing capacity criterion (4). Basic design assumptions. Design values of actions. Design bearing capacity of cross sections (2). Design of elements subjected to bending stress (2). Minimum area of reinforcement. Short elements subjected to compressive stress. Centrally stressed elements (2). Elements subjected to eccentric stress around one axis (2). Compressive stress (2). Centric tensile stress. Eccentric tensile stress (4). Elements subjected to transverse forces. Dimensioning of elements subjected to transverse forces. Elements with reinforcement for countering the transverse force action (2). Complex stress action by bending moment and transverse force (2). Complex stress action by bending moment, transverse force and longitudinal force (2).				
Course contents auditory	Oral preparations for the program: Load analysis, statical design of reinforced-concrete slabs (3), reinforced-concrete slab dimensioning (3); load analysis, static design of girders (3), reinforced-concrete girder dimensioning (3).				
Course contents structures	Elaboration of program for a reinforced-concrete structure: structural analysis, dimensioning, and bending schedule for structural elements.				
Exam literature	Basic literature: I. Tomičić: Concrete structures, Školska knjiga, Zagreb, 1988 and 1996. I. Tomičić: Manual for the design of reinforced-concrete structures, DHGK, Zagreb, 1993. Additional literature: 1. Regulations applicable to technical standards for concrete and reinforced concrete, Official Gazette 11/87. 2. Z. Sorić: Concrete structures 1, Hrvatski savez građevinskih inženjera, Zagreb, 1999.				
Knowledge evaluation	Program approval is a prerequisite for the lecturer's second signature. Written examination covering theory and problems presented during exercises. Oral examination (this examination may be taken only by students that solved at least 50% of problems during the written examination).				
Prerequisites:	Students cannot enroll in this course unless they have passed Descriptive Geometry in Civil Engineering I Students cannot enroll in this course unless they have passed Structural Design Students cannot enroll in this course unless they have completed Construction Materials Students cannot enroll in this course unless they have passed Mathematics I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18567/22382	ECTS	5	Type	
Name	Concrete Structures II				
Status	4th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (9+0+0+90+21)	
Teachers	dr.sc. Igor Gukov , dipl.ing.grad., Nositelj predmeta, dr.sc. Igor Gukov , dipl.ing.grad., dr.sc. Igor Gukov , dipl.ing.grad.,				
Course objectives	Acquirement of theoretical and practical knowledge about concrete structures in building engineering.				
Knowledge and competences	Calculation and dimensioning of reinforced concrete members, slabs and walls.				
Values:	-				
How lectures are held	Oral presentation of lectures using teaching aids as appropriate. Design models are presented and used to explain physical condition. Questions are asked during lectures to enhance student participation, and to encourage students to think and make conclusions in the way they will be expected to do in their future work.				
How auditory exercises are held	Students are prepared for elaboration of the assignment. Individual portions of the assignment are presented on selected examples, with a particular emphasis on dimensioning and bending schedule drawing.				
How construction exercises are held	Aided by the lecturer and assistant when necessary, students independently prepare their assignment.				
Course contents lectures	Elements stressed by torsion. Dimensioning elements stressed by torsion (2). Limit state method. Calculating stress caused by torque and torsional rigidity (2). Design strength of concrete in elements lacking torsional rigidity. Bearing capacity of elements lacking torsional reinforcement. Calculation of reinforcement taking into account circular torsion. Stressing by torque. Minimum and maximum reinforcement (2). Slab design for puncture strength. Slab strengthening to prevent puncture. Critical cross section. Slab reinforcement to prevent puncture (2). Serviceability limit state for reinforced-concrete structures and elements (2). Limit state for cracking. Minimum reinforcement requirement to limit cracking. Limiting diameter and spacing of reinforcing bars. Determination of crack width (2). Threshold strain. Determination of deflection (2). Design and structural principles for elements and structures. Basic structural elements (2). Plates. Beams. Wall girders. Columns and walls. Girder reinforcing over two or mere bearings. Plates. Beams. Longitudinal reinforcement. Transverse reinforcement. Distribution of longitudinal reinforcement. Reinforcement of high beams (2). Reinforcement of protective layer. Reinforcement of surface girders with steel fabric (2). Reinforced-concrete elements and structures. Ceilings. Slabs with bearing capacity in one direction. Slabs with bearing capacity in both directions. Slabs with bearing capacity in tow orthogonal directions (2). Assumptions and design. Approximate design of slabs with bearing capacity in two directions. Reinforcement of rectangular slabs with bearing capacity in tow directions (2). Reinforced concrete foundations (2). Isolated footings. Strip footings. Foundation slabs (2). Wall girders. Design for bending moment. Design for transverse forces. Wall girders subjected to concentrated load (2).				
Course contents auditory	Oral preparations for the assignment: Drawing bending schedule for a slab (2). Drawing bending schedule for a beam (2). Load analysis and static design for a column (2). Column dimensioning, skew bending (w). Design and dimensioning of foundations (1).				
Course contents constructures	Preparing assignment for a reinforced-concrete structure: static calculation, dimensioning and bending schedule for slabs, walls and frame structures (21).				
Exam literature	Basic literature:I. Tomičić: Concrete Structures, Školska knjiga, Zagreb, 1988 and 1996.I. Tomičić: Manual for the Design of Reinforced-Concrete Structures, DHGK, Zagreb, 1993.Additional literature:1. Byelaw on technical standards for concrete and reinforced concrete, Official Gazette, 11/87.2. Z. Sorić: Masonry Structures I, Hrvatski savez građevinskih inženjera, Zagreb, 1999.				
Knowledge evaluation	Assignment submittal is a precondition for the second signature.Written examination relating to the theory and problems solved during the exercises.Oral examination (may be taken only by students who solved at least 50 percent of problems during the written part of the examination)				
Remark	Preparation of final paper is possible				
Prerequisites:	Students cannot enroll in this course unless they have completed Concrete Structures I Students cannot enroll in this course unless they have passed Construction Materials Students cannot pass this course unless they have passed Concrete Structures I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18551/22367	ECTS	5	Type	
Name	Conduct of Company Business Operations				
Status	5th semester - Compulsory courses - Management in Civil Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (12+0+0+90+18)	
Teachers	Željko Tintor , Nositelj predmeta, Željko Tintor , Željko Tintor ,				
Course objectives	Students will acquire some basic knowledge about companies, their interaction with other subjects, and their business principles and objectives.				
Knowledge and competences	Knowledge on the efficiency and principles of company operation, elements of accounting and bookkeeping, elements of the theory of market and prices, and application of these factors in the company structuring and conduct of business.				
Values:	-				
How lectures are held	Appropriate teaching aids (video projector and computer) will be used to present in the most understandable manner the topics covered during the lectures.				
How auditory exercises are held	Elements of business operations in real-life companies are presented, including the accounting work as related to such operations. The work efficiency and success of such companies is commented.				
How construction exercises are held	Students are required to independently solve problems as related to the preparation of the assignment (evaluating efficiency of companies) using a real-life company as an example.				
Course contents lectures	General concept, types and objectives of companies (2). Company as a system and its interaction with other subjects (2). Operating principles (2). Objectives of company operation, effectiveness and efficiency (2). Principal manufacturing theories (2). Principal price theories (2). Principal cost theories (2). Factors relating to manufacturing processes (2). Outcome of production work in construction industry (2). Organizational systems and structure of companies (4). Notion of company assets and classification of such assets (2). Elements of accounting and bookkeeping (4). Analysis of business results and business success (2).				
Course contents auditory	Analyses and comments: conduct of business, accounting and bookkeeping, costs, assets, business success, all based on real examples from practice.				
Course contents constructions	Students independently prepare the assignment "evaluating efficiency of companies".				
Exam literature	Basic:1.S. Kapustić, Methodics of Organization Planning, Zagreb, Samobor, 1989.2.M. Žaja, Production Economics, Školska knjiga, Zagreb, 1992.Additional:1.D. Grubišić: Business Economics, Sveučilište u Splitu, Split 2004.2.B. Medarić: Management in Construction Industry, Građevinski fakultet, Osijek, 1997.				
Knowledge evaluation	assignment (evaluating efficiency of companies) - explanation of assignmentwritten examination from theory (lectures) and exercises (solving problems based on the assignment)oral examination (to be taken by students who passed the written examination)				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Market and Business Environment Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18543/22358	ECTS	4	Type	
Name	Construction Machinery				
Status	4th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+90 (15+0+0+75+0)
Teachers	mr.sc. Petar Adamović prof.v.škole, Nositelj predmeta, prof.dr.sc. Zdravko Linarić dipl.ing.građ., Nositelj predmeta, Boris Uremović dipl.ing.građ.,				
Course objectives	The aim of the course is to teach students the possibilities and operation of construction machines, and the way they are included in complex technological processes during realization of civil engineering and building projects.				
Knowledge and competences	The students will learn the technique and technology of using construction machines in various types of construction work, selection of an appropriate technology in relation to the type of work, calculation of performance and harmonization of work processes when several machines are used.				
Values:	-				
How lectures are held	In the course of lectures, the operation of construction machines during realization of various technological processes is presented through photographs or films, including video recordings from real on-site situations, using at that various teaching aids, video projectors, and computers.				
How auditory exercises are held	Problems relating to selection of an appropriate technology, performance calculation, and harmonization of work in a group of machines, are solved on the blackboard. Video tapes showing real life technological processes are presented.				
Course contents lectures	Development and use of construction machines (2). Classification of construction machines and performance calculation (2). Selection of construction machines and technological processes (2). Organization and harmonization of work in a group (2). Earthwork machinery (machines for excavation, loading and transport, machines for compaction, machines for excavation in stone material) (4). Stone material processing machines (crushers, mills, sieves, separators) (2). Freight lifting and transporting machines (2). Machines for concretework (production, transport and placement of concrete) (4). Machines for asphalt work, asphalt plants and machines for the treatment of asphalt courses (4). Machines for foundation work (2). Machines for maintenance of buildings (2). Carpenter and iron working plant (2).				
Course contents auditory	Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a selected technological system and for various types of work.				
Exam literature	Basic literature:1. E. Slunjski, Machines in Construction Work, Sveučilište u Zagrebu, 1995.2. P. Đukan and others: Machines in Construction Work, Građevinar, Zagreb, 1991.Additional literature:1. Z. Linarić: Internal notes from lectures given at the Faculty of Civil Engineering, University of Zagreb (can be found at the web site www.grad.hr)2. G. Bučar: Standards and Prices in Construction Industry, University of Rijeka, Rijeka, 2003.3. B. Trnojević: Construction Machines, Građevinska knjiga, Beograd, 1988.				
Knowledge evaluation	Written examination for testing theoretical knowledge (lectures) and knowledge gained during exercises (solving problems based on auditory exercises).Oral examination (may be taken by students that passed the written part of the examination)				
Proposal made by	(21.3.2011.)				



Code WEB/ISVU	18545/22360	ECTS	5	Type	
Name	Construction Management I				
Status	5th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+121 (9+0+0+91+21)	
Teachers	mr.sc. Petar Adamović prof.v.škole, Nositelj predmeta, Dario Barbalić , Dario Barbalić , Danijel Bicač dipl.ing.građ., Danijel Bicač dipl.ing.građ., Zvane Brumnić , Zvane Brumnić , mr.sc. Časlav Dunović , viši predavač, mr.sc. Časlav Dunović , viši predavač,				
Course objectives	Students will acquire theoretical, practical and operative knowledge and skills for the management of construction work on various civil engineering and building engineering projects.				
Knowledge and competences	Students will be able to organize and manage the construction site - analyze documents serving as basis for construction work, to select and organize construction technology and put in place all resources needed for the realization of work, to plan and monitor construction time and cost, to independently prepare offers for the realization, procurement and payment of work.				
Values:	-				
How lectures are held	Appropriate teaching aids (video projector and computer) will be used to present construction processes, construction methods as used in real-life situations, work planning methods, including graphical plans and video recordings as needed to explain topics covered in the course.				
How auditory exercises are held	Units necessary for preparation of the assignment (construction management project in civil engineering and building engineering) are presented in a logical order.				
How construction exercises are held	Students independently solve problems as needed for preparation of the assignment (construction management project in civil engineering and building engineering).				
Course contents lectures	: Introduction to construction management; definitions and basic terms (2). Work processes and their properties (classification, presentation) (2). Organization and classification of construction processes (2). Preparation and organization of production in construction industry (2). Production downtimes and related losses (2). Construction management project (purpose and components) (2). Work method selection and design of technological processes (2). Site management (2). Purpose and objective of planning in construction industry (2). Classification of plans (4). Selecting plan type and plan elaboration methodology (4). Plan elaboration procedure (activities, relationships, time calculation, representation) (4). Introduction to the cost theory; notion of cost, type and location of cost (2). Business principles, rationalization, productivity, economic considerations, rentability (4). Cost planning and controlling (2). Notion of cost estimation; types, structures and methods of cost estimation (2) Calculation of direct costs; price analysis (4). Calculation of indirect costs, factor calculation (2). Legal standards, legal subjects, legal relationships, types of obligations and their legal effects (2). Construction law (2). Technical documentation (2). Administrative permits (location permit, building permit, and operating permit) (2). Law on public procurement of work (2). Construction site documentation (2). Payment of work (2).				
Course contents auditory	Bill of quantities (2). 2. Summary of materials (2). 3. Selection of machines and equipment, selection of machine performances, harmonization of work in a group, composition of work groups (2). 4. Analyzing structure of time schedules, list of activities with time calculation for each activity (2). 5. Critical path diagram with time analysis (PDM method) (2). 6. Gantt chart, bar chart (2). 7. Labour lodging requirement calculation, storage space calculation (2). 8. Construction site layout (2). 9. Price analysis, cost estimate (2).				
Course contents constructsures	Student independently prepares the programme called "Construction management project in civil engineering and building engineering".				
Exam literature	Basic:1. J. Klepac: Construction Management, Sveučilište u Zagrebu, Građevinski fakultet, 1984.2. J. Klepac: Construction Management - Site Organization, Sveučilište u Zagrebu, Građevinski fakultet, 1982.3. J. Marušić: Construction Management, Sveučilište u Zagrebu, 1994. Additional:1. R. Lončarić: Organization of Construction Projects, Hrvatsko Društvo Građevinskih inženjera, Zagreb, 1995.2. Building Estimator Reference Book, Građevinar, Zagreb, 1986.3. J. Klepac: Study of Work in Construction Industry, GI FGZ, Zagreb, 1982.4. G. Bučar: Work Standards and Prices in Construction Industry, Sveučilište u Rijeci, Rijeka, 2003.				
Knowledge evaluation	Assignment "Construction management project in civil engineering and building engineering" - explanation of the program. Written examination with questions from theory (lectures) and exercises (problem solving based on the construction management program).				
Remark	Oral examination (may be taken by students that passed the written part of the examination)				
Prerequisites:	Students cannot enroll in this course unless they have completed Construction Machinery Students cannot enroll in this course unless they have passed Mathematics II Students cannot pass this course unless they have passed Construction Machinery				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18546/22361	ECTS	5	Type	
Name	Construction Management II				
Status	6th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+121 (9+0+0+91+21)
Teachers	mr.sc. Petar Adamović prof.v.škole, Nositelj predmeta, Dario Barbalić , Dario Barbalić , Danijel Bicak dipl.ing.građ., Danijel Bicak dipl.ing.građ., Zvane Brumnić , Zvane Brumnić , mr.sc. Časlav Dunović , viši predavač, mr.sc. Časlav Dunović , viši predavač,				
Course objectives					
Knowledge and competences					
Values:	- - - - -				
Prerequisites:	Students cannot enroll in this course unless they have completed Construction Technology Students cannot enroll in this course unless they have completed Construction Management I Students cannot pass this course unless they have passed Construction Management I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18519/22324	ECTS	5	Type	
Name	Construction Materials				
Status	1st semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (10+20+0+90+0)	
Teachers	Sanja Lađarević dipl.ing.arh., Nositelj predmeta, mr.sc. Miroslav Magerle dipl.ing.grad, Nositelj predmeta, mr.sc. Donka Wurth predavač, Nositelj predmeta, Karla Ille dipl.inž.grad., Karla Ille dipl.inž.grad., Sanja Lađarević dipl.ing.arh., Sanja Lađarević dipl.ing.arh., mr.sc. Miroslav Magerle dipl.ing.grad, mr.sc. Miroslav Magerle dipl.ing.grad, mr.sc. Donka Wurth predavač, mr.sc. Donka Wurth predavač,				
Course objectives	Determination of physical properties of construction materials.				
Knowledge and competences	During this course, students will acquire knowledge on various types and properties of materials, and on their use in the field of civil engineering. Independent testing of material properties in laboratory based on applicable Croatian standards.				
Values:	-				
How lectures are held	The lecturer presents basic information about materials, from the structure and interaction of individual components, to the mechanical, thermal, acoustical and other properties relevant to the use of these materials in civil engineering.				
How auditory exercises are held	Students solve problems related to topics covered during the lectures. Students are prepared for laboratory sessions and for the preparation of programs.				
How laboratory exercises are held	Using the obligatory literature, Students perform tests in accordance with applicable Croatian standards and prepare obligatory assignments related to the following topics: physical parameters, cement, aggregate, fresh concrete, strength and deformation of concrete, and non-destructive testing. The data acquired during laboratory sessions are partly used by students during preparation of programs.				
Course contents lectures	Information about materials. Statistical processing. Structure and correlation of substances. Mechanical properties of materials. Thermal, acoustical and transport properties. Binders. Cement. Stone. Aggregate. Additions, admixtures. Water. Mortars. Fresh concrete. Composition of concrete of specified workability and strength. Strength of concrete. Deformation of concrete. Production of concrete. Durability of concrete. Special types of concrete and special concrete technologies. Quality control, quality assurance and quality management. Wood. Adhesives. Glass. Paints and varnishes. Metals. Ceramics. Polymers.				
Course contents auditory	Statistical processing. Physical parameters. Mechanical properties and permeability. Cement (significance, cement grade, calculation of mineralogical composition of cement, calculation of hydration heat, calculation of cement paste temperature, cement grade determination). Aggregate (aggregate grading, calculation of cumulative grading, influence of moisture and absorption of aggregate, determination of aggregate shape). Fresh concrete (designing concrete mixes of specified workability and concrete grade, influence of temperature of individual components on the temperature of the fresh concrete mix). Strength and deformation of concrete. Special tests (sclerometer, ultrasound, pull-off, concrete moisture, penetrability, reinforcing steel)				
Course contents laboratory	Determination of physical properties of materials (density, bulk density, absorption, surface moisture, moisture, water absorption, porosity). Determination of basic properties of cement (standard consistence and density). Properties of aggregates (quartering, grading, aggregate grain shape testing, determination of silty and clayey particles in aggregate, grain shape determination). Concrete composition design, preparation of concrete mixes, testing properties of fresh concrete: consistence, pores, density, sampling. Determining strength and strain of concrete (compressive and tensile strength, modulus of elasticity). Non-destructive testing: sclerometer and ultrasound.				
Exam literature	Basic literature:1. Ukrainczyk, V.: Introduction to construction materials, Institut građevinarstva Hrvatske, Alcor, Zagreb, Udžbenik Sveučilišta u Zagrebu, 2001.2. Ukrainczyk, V.: Concrete: structure, properties, technology, Građevinski fakultet Sveučilišta u Zagrebu, 1994.3. Bjegović, D. et al: Auditory sessions, exercises, active lecturing, Građevinski fakultet Sveučilišta u Zagrebu, 1994.Additional literature:1. Ashby Micael F., Joneas David R.H.: Engineering Materials 1, Butterworth-Heinemann, Oxford-Boston- Johannesburg-Melbourne-New Delhi - Singapore, 1996.2. Illston J.M., Construction Materials, their nature and behaviour, EFN SPON Chapman Hall, London-Glasgow-New-York-Tokyo-Melburne-Madras, 1994.				
Knowledge evaluation	The examination consists of the written and oral portions.				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18547/22362	ECTS	5	Type	
Name	Construction Technology				
Status	5th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+121	(9+0+0+91+21)
Teachers	prof.dr.sc. Vjeran Mlinarić dipl.ing.građ, Nositelj predmeta, Boris Uremović dipl.ing.građ., Nositelj predmeta, Boris Uremović dipl.ing.građ., Boris Uremović dipl.ing.građ.,				
Course objectives	to recognize problems in the field of concrete work, scaffolding, formworks, and assembly work, to independently solve technological problems on the site, and to communicate in a technically correct way with designers and other participants in the construction process.				
Knowledge and competences	Students will learn to select and use formwork systems and scaffolds on practical assignments, calculate and dimension transport and placement of concrete, and dimension equipment needed for the transport and assembly.				
Values:	-				
How lectures are held	In the course of lectures, the lecturer continuously presents technological processes through drawings, photographs, films and video recordings showing real-life examples. Demo-samples are presented for major formwork systems.				
How auditory exercises are held	Problems are solved on the blackboard.				
How construction exercises are held	Students independently solve problems defined by the lecturer.				
Course contents lectures	Technique, technology and preparation work for concrete (2). Production, transport and placement of fresh concrete (4). Scaffolds and formworks (6). Selecting and planning formwork systems and scaffolds (2). Technique and technology for manufacturing concrete products, blocks and small elements (manufacturing plants, systems, areas and lines) (2). Equipment for installation of concrete products (2). Technique and technology for manufacturing prefabricated elements and assemblies (4). Machinery, equipment and devices for the installation of elements and assemblies (4). Technology used for the assembly of buildings, halls and bridges (2). Selecting and planning application of prefabricated systems (2).				
Course contents auditory	Calculation of concrete pressure acting on horizontal and vertical formwork (1). Sliding formwork calculation and dimensioning (2). Calculating disposition of formwork system along specified wall and ceiling areas (2). Calculating and dimensioning transport of concrete to a construction site (2). Assembly crane selection and dimensioning (2).				
Course contents constructsures	Assignment preparation: For a given plan disposition, students have to select the formwork system and, based on skills acquired during auditory exercises, they position the system along walls and ceilings. Students also calculate concrete pressure within the formwork, determine consumption of materials and components, and calculate cost per unit installed.				
Exam literature	Basic: Gorazd Bučar: Wood Working, Iron Bending and Concrete Work Activities on Construction Sites, Građevinski fakultet J.J. Strossmayer in Osijek. Rudolf Lončarić: Organization of Construction Projects, HDGI, 1995. Lecture notes and materials handed out during lectures and exercises (bound set of lectures) Additional: www.grad.hr, Zdravko Linarić, documents available for download: "Material manufacturing plants, Part 1, Concrete plants", "Selection of Machines and Mechanical Work planning in Construction Industry".				
Knowledge evaluation	assignment (students must provide explications relating to their assignments) test examination (the written part of the examination consists of 2 problems; during oral part of the examination students must provide answer to 6 questions related to the course)				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Construction Machinery Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design Students cannot pass this course unless they have passed Construction Machinery				
Proposal made by	(04.10.2009)				



Code WEB/ISVU	18520/38169	ECTS	3	Type	
Name	Descriptive Geometry in Civil Engineering I				
Status	1st semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+76 (7+0+0+61+8)
Teachers	Mirela Katić-Žlepalo prof.mat., Nositelj predmeta, Ivana Božić dipl.prof.mat., Ivana Božić dipl.prof.mat., Mirela Katić-Žlepalo prof.mat., Mirela Katić-Žlepalo prof.mat.,				
Course objectives	The developing of students spatial perception, spatial reasoning and solving spatial problems by using constructive method.				
Knowledge and competences	Representation of 3D objects on 2D images, as well as the interpretation of given images.				
Values:	-				
How lectures are held	Projection methods are explained by using follies and computer animations. The spatial problems are solving in projections by constructive method at the blackboard. Main part of lectures are performed dynamically in PowerPoint.				
How auditory exercises are held	Problems are solved at the blackboard or on computer.				
How laboratory exercises are held	Each student designs his drawing with AutoCAD (in2nd semester). Lecturers corrections are obliged.				
How construction exercises are held	Each student designs his drawing on paper. Lecturers corrections are obliged.				
Course contents lectures	Curves of the second order. Basics geometric constructions. (2) Monge's method. Orthogonal projections on the pair of orthogonal planes. Projections of points, lines and planes. Solving incidence and metric problems. Profile and side projections. Elementary and complex spatial relationships of solids in orthogonal projections. (9) Intersections. Intersections of surfaces of revolution (cones, cylinders, spheres) and planes. (4)				
Course contents auditory	Construction of second degree curves. (2) Monge's method: site and metric problems, projections of solids. (6) Intersections of surfaces of revolution and planes. (4) Axonometric methods: oblique axonometry of objects and oblique projection of vez drveta. (4) Roof surfaces. (2) Earthwork on the terrain by means of contour lines. (4)				
Course contents constructions	Students solve problems from the following parts: 1. Monges method: incidence and metrical tasks, solids in general position. (4) 2. Intersections of surfaces of revolution and planes. (6) 3. Axonometric methods: oblique axonometry of object, oblique projection of object. (4) 4. Roof surfaces (4) 5. Earthwork on the terrain by means of contour lines. (5)				
Exam literature	Basic literature:1. K. Horvatić-Baltasar, I. Babić: Nacrtna geometrija, SAND d.o.o., Zagreb, 1997.2 .I. Babić, S. Gorjanc, A. Sliječević, V. Szivovicza: Nacrtna geometrija-zadaci, HDKGIKG, Zagreb, 2002.Additional literature:1 .V. Szivovicza, E. Jurkin Deskriptivna geometrija Compact Disc. , in print, Zagreb, 2005.2 .www.grad.hr/nastava/geometrija web-script				
Knowledge evaluation	Programmes: Orthogonal projections of solids in general positions (1st semester); Intersections, Axonometry, Roof surfaces, Terrains (2nd semester)Colloquia: Monge's method (1st semester); Projection with heights (2.sem.)Condition for 2nd signature: 5 programmes and 2 colloquia in 1st and 2nd semesterWritten parth of exam: solving problems connected with the content of curricula (2 preliminary exams)Oral parth of exam: after written parth, explanation of spatial relationships.				
Proposal made by	(25.09.08.)				



Code WEB/ISVU	18578/38170	ECTS	3	Type	
Name	Descriptive Geometry in Civil Engineering II				
Status	2nd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+76 (10+0+0+46+20)
Teachers	Mirela Katić-Žlepalo prof.mat., Nositelj predmeta, Ivana Božić dipl.prof.mat., Ivana Božić dipl.prof.mat., Mirela Katić-Žlepalo prof.mat., Mirela Katić-Žlepalo prof.mat.,				
Course objectives					
Knowledge and competences					
Values:	-				
Prerequisites:	Students cannot enroll in this course unless they have completed Descriptive Geometry in Civil Engineering I Students cannot pass this course unless they have passed Descriptive Geometry in Civil Engineering I				
Proposal made by	(25.09.08.)				



Code WEB/ISVU	18526/22335	ECTS	2	Type	
Name	Elementary Geology				
Status	2nd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+45 (15+0+0+30+0)
Teachers	dr.sc. Tatjana Vlahović prof.v.škole, Nositelj predmeta, dr.sc. Tatjana Vlahović prof.v.škole,				
Course objectives	To get elementary knowledge on geology in order to recognize geological problems in civil engineering and to be able to communicate with geologists and other experts involved in the civil engineering.				
Knowledge and competences	To introduce students to geological terminology and elementary knowledge of mineralogy, petrology, general geology, hydrogeology and engineering geology, and getting knowledge on (1) basic classification of the rocks and minerals; (2) understanding and using of geological maps; (3) ground water as a part hydrological cycle; (4) understanding of hydrogeological and engineering geological properties of rocks; (5) understanding the role of geological investigations in the civil engineering, and (5) the role of the geology in the environmental protection and planned, sustainable development.				
Values:	-				
How lectures are held	Geological phenomena, rocks and mineralogical composition are explained with the use of simple models, drawings and photographs as well as samples of minerals and rocks to make the understanding easier. For some chapters and for all lectures, students will get notes. Explanations for particular terminology will be given by using examples for the field. During the lectures some questions will arise asking for active participation of students and developing their way of thinking. This will also help them in practical work to find answers and get to conclusions in some particular problems.				
How auditory exercises are held	Practical part of the lectures will be given through the auditory exercises. Learning objectives will be connected with the particular examples which can be explained and solved through the active participation of students.				
Course contents lectures	(1) Introduction to geology. Composition of the Earth. Lithosphere. Minerals. Crystals. Physical and chemical properties of minerals. (2) The main petrogenic minerals (silicates and non-silicates) composition and systematisation; (3) Igneous rocks: structures, textures, systematisation; (4) Metamorphic rocks: origin of metamorphic rocks; (5) Sedimentary rocks: structures, textures, systematisation (clastics sedimentary rocks and carbonate); (6) Geologic time. Determining ages of rocks. Chronostratigraphic and lithostratigraphic classification of the geologic past; (7) Geologic structures. Primary and secondary structures. Secondary structures: joints, faults faults of systems and folds descriptive characteristics, classification and impact on the stability of slopes; (8, 9, 10) Hydrogeology the role in the civil engineering. Hydrological cycle. Ground water porosity and permeability of the rocks, movement of the ground water, physical chemical properties of ground water; hydrogeological function of the rocks, classification of the aquifers, classification of the springs; (11, 12) Geology and hydrogeology of the Karst. Weathering processes in carbonate. Morphological features of Karst: sinkholes, ponors, caves and jama; (13) Basic hydrogeological investigations in the civil engineering methodology and the content of the hydrogeological investigations, hydrogeological investigations for the realization engineering and other objects drying of the outlet tunnel, Hydraulic objects, investigations of ground water for water supply; (14, 15) The role of engineering geology in the civil engineering. Classification of the rocks: geological description, engineering properties of rocks and engineering problems. Geodynamic processes.				
Course contents auditory	sessions: (1) Determination of the rocks igneous, metamorphic and sedimentary rocks; (2) Geologic maps: what they show, how they are made and used. Examples of sheets and explanation of Basic geological maps M 1: 100 000; (3) Interpretation of the geologic structures; (4,5) Pumping test and determination of hydrogeological parameters from the data of pumping data; (6) Typical examples of morphologic features and hydrogeological objects in the karst terrains of Croatia; (7,8) Geodynamic processes: Risk and estimation of the hazards. Earthquakes and with them connected processes. Volcanism. Landslides. Subsidence. Expanding soil. Processes on the coast; (9) Example of landslides in Croatia and world; (10,11,12) Basic engineering geological investigations in the civil engineering: elements and type of investigations. Tunnels. Hydraulic objects. Roads. Geophysical investigations. Research drilling. (13,14) Environmental Geology. General aspects of exploitation mineral resources deposit. Pollution and protection of the ground water. Typical examples from the Croatia and existing legislative; (15) Visiting to interesting hydrogeologic/engineering-geologic objects. Visiting to RGN faculty.				
Exam literature	Basic: Herak, M. (1984): Geologija., Školska knjiga, Zagreb. Šestanović, S. (1990): Osnove geologije i petrografije. Primjena u građevinarstvu. Školska knjiga, Zagreb. The materials given on the lectures and sessions. Additional: Plummer, C.C., McGeary, D. Carlson, D.H. (1999) Physical geology., WCB-McGraw-Hill Publishers, Boston 00 Toronto. Domenico, P.A. Schwartz, F.W. (1997) Physical and chemical hydrogeology. J. Willey sons. Goodman, R.E. (1993) Engineering geology. Rock in engineering construction. John Wiley and So. New York, 412 p. Tišljarić, J. (1999): Petrologija s osnovama mineralogije. 1-212, Udžbenici Sveučilišta u Zagrebu, RGN fakultet, Zagreb. Vrkljan, Maja (2001): Mineralogija i petrologija 00 osnove i primjena. 1-207, Udžbenici Sveučilišta u Zagrebu, RGN, Zagreb. Šestanović, S. (1993): Osnove inženjerske geologije. Primjena u graditeljstvu. Geing, Split.				
Knowledge evaluation	four colloquium during the semester are planned, at the end of each lecture series: 1. composition of the lithosphere, mineralogy and petrology, 2. listening and understanding of the geological map, 3. hydrogeology, 4. engineering geology				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18518/22323	ECTS	6	Type	
Name	Engineering Mechanics				
Status	1st semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			45+135	(30+0+0+105+0)
Teachers	mr.sc. Zorislav Despot dipl.ing.građ, Nositelj predmeta, mr.sc. Ljerka Kopričanec-Matijevac viši predavač, mr.sc. Željko Lebo dipl.ing.građ, dr.sc. Heinrich Werner prof.v.škole,				
Course objectives	The objective of the course is to provide basic knowledge in Engineering Mechanics, with an emphasis on its use in civil engineering as a basis for proper understanding of professional courses.				
Knowledge and competences	State of equilibrium and its application on a structural member; calculation of internal forces for a structural member; stress fields.				
Values:	-				
How lectures are held	Basic elements of technical mechanics are explained based on numerical and graphical procedures. The state of equilibrium is studied on design models and, instead of tests, similar examples from natural environment and civil engineering practice are presented. Students are also provided with up to date lecture notes containing additional information.				
How auditory exercises are held	problem solving with active participation of students				
Course contents lectures	Objectives of Engineering Mechanics. Basic laws and principles. Units of measurement. Definition and presentation of forces and moments. Equivalency of force systems. Equilibrium conditions. Essential elements of graphical methods for force systems in a plane; Friction. Geometrical cross-sectional properties of structural members (15); The concept of internal forces. (15) Mechanical behavior of solids. Concept of stress, displacement and strain. Plane stress analysis. Orientation and size of principal stresses. Mohr's circle. Hooke's law for isotropic homogeneous bodies. Poisson ratio. St. Venant's principle and superposition principle. Stress concentration. Shear. Shear and elasticity modulus. Cut. Pure bending. Transverse force bending. Principal bending stresses and stress trajectories. Longitudinal force bending. Core of a cross section. Neutral axis and extreme stresses. Oblique bending. Buckling. (15)				
Course contents auditory	are divided into three thematic groups: Equilibrium of solids (8); Internal forces for flat balanced structural members (12); Biaxial homogeneous stress field (10)				
Exam literature	Basic: H. Werner: Engineering Mechanics, Lecture Notes, Zagreb, 1986. Z. Despot: Lecture offprints. V. Šimić: Resistance of Materials I, Školska knjiga, Zagreb, 1992. Additional: V. Šimić: Resistance of Materials II, Školska knjiga, Zagreb, 1995. Solved problems and offprints from tutorial sessions available at web pages: www.grad.hr/aj (these pages are updated on a regular basis)				
Remark	After passing this examination, students are considered ready for the course Structural Design.				
Proposal made by	(15.08.2011)				



Code WEB/ISVU	18573/39032	ECTS	2	Type	
Name	English Language I				
Status	3rd semester - Elective courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+45 (0+0+0+30+15)
Teachers	dr.sc. Ivana Špiranec viši pred., Nositelj predmeta, dr.sc. Ivana Špiranec viši pred.,				
Course objectives					
Knowledge and competences					
Values:	-				
Proposal made by	(22.9.2008)				



Code WEB/ISVU	18574/22352	ECTS	5	Type	
Name	English Language II				
Status	4th semester - Elective courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (0+0+0+90+30)	
Teachers	dr.sc. Ivana Špiranec viši pred., Nositelj predmeta, dr.sc. Ivana Špiranec viši pred., Zoran Vulelija ,				
Course objectives					
Knowledge and competences					
Values:	-				
Prerequisites:	Students cannot enroll in this course unless they have completed English Language I Students cannot pass this course unless they have passed English Language I				
Proposal made by	(22.9.2008)				



Code WEB/ISVU	18535/22350	ECTS	2	Type	
Name	Environmental Protection				
Status	3rd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+46 (6+0+9+31+0)
Teachers	dr.sc. Nenad Mikulić izv.prof., Nositelj predmeta, dr.sc. Nenad Mikulić izv.prof., dr.sc. Nenad Mikulić izv.prof.,				
Course objectives	Qualifying the student to recognize the significance of environmental protection issues and sustainable development of renewable resources.				
Knowledge and competences	Knowledge on relevant environmental protection issues and skills to find suitable instruments for their solution.				
Values:	-				
How lectures are held	Students are gradually introduced into basic concepts of environmental protection, connection of nature and environment, protection of non-renewable resources and spatial protection. Each methodological unit is accompanied by an overview of administrative and institutional organization at local and national levels. Modern educational tools, including graphic and photographic illustrations, are used in lectures.				
How auditory exercises are held	Individual thematic units are covered together (task-solving and problem presentation).				
How seminar exercises are held	Students work in groups of possibly interdisciplinary composition. Through joint work, they practice how to define and solve problems and also acquire skills of group/individual presentation and defence of their own standpoints.				
Course contents lectures	Introduction to history of environmental protection and sustainable development (1). Basic concepts: environmental protection, nature protection, ecology, habitats, biotopes, eco-system, biodiversity (2). Environmental pressures (2). Changes and pollution in pedosphere, hydrosphere, atmosphere and biosphere (2). Human impact on the environment: urban settlements, natural resources, waste, infrastructure (2). Environment and health (1). Measures and procedures of environmental protection: policy of environmental protection, social awareness, education, legal, economic and financial measures, planning, clean technologies (3). Public right to information and participation in decision-making (1). European Union and environmental protection (1).				
Course contents auditory	Presentation and explanation of individual topics planned for seminar preparation (6).				
Course contents seminars	: Instructions and consultations during seminar preparations in the following areas: living environment (3); pressures and impacts (3); measures and procedures of protection (3).				
Exam literature	Basic: 0 Internal course materials prepared by the lecturer. 0 Glavač, V., Uvod u globalnu ekologiju, Hrvatska sveučilišna naklada, Zagreb, 2001 0 Odum, P.E.: Fundamentals of Ecology, W.B.S.C., 1971. Additional: Gondie, A.: The Human Impact of the Naturel Environment, 1990. Carpenter, T.G.: Environment, Construction and Sustainable Development, Volume 1 and 2, John Wiley Sons, 2001. Strategija zaštite okoliša Republike Hrvatske (Environmental Protection Strategy of the Republic of Croatia)				
Knowledge evaluation	Seminar preparation, presentation and defence. Written exam.				
Prerequisites:	Students cannot enroll in this course unless they have completed Elementary Geology Students cannot enroll in this course unless they have passed Mathematics I Students cannot pass this course unless they have passed Elementary Geology				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18544/22359	ECTS	2	Type	
Name	Field Practice				
Status	4th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				0+60 (30+0+0+30+0)
Teachers	Boris Uremović dipl.ing.građ., Nositelj predmeta, mr.sc. Petar Adamović prof.v.škole, mr.sc. Časlav Dunović , viši predavač,				
Course objectives	During this course, the students will acquire some basic knowledge about various technological and organizational procedures relating to the realization of work and production of on-site documents.				
Knowledge and competences	Students will obtain some elementary information about practical construction work, documentation used in relation to this work, and the real-life construction process.				
Values:	-				
How auditory exercises are held	Students will be prepared for participation in site work and for solving practical problems on the construction site.				
How construction exercises are held	Students are required to independently complete the assignment "Field Practice Site Diary" in full accordance with construction processes on the site, and based on instructions received during auditory exercises.				
Course contents lectures	The field practice will last one month (180 working hours) and will be realized in summer months (July or August) when students are not excessively occupied with lectures and examinations. Students are required to come each day to the location and to participate in field practice activities during full working hours. During the field practice, students are required to visit at least one manufacturing plant.				
Course contents auditory	Preparations for field practice, learning how to prepare site diary, examples from real construction sites.				
Course contents constructsures	First part of the diary :Site organisation plan. Organization plan for one manufacturing plant, with description of the organization of work and production. Location and technical description of the structure. Description of civil engineering, finishing and installation works on the project. Use of machinery, solution to transport problems during construction. Keeping and updating site documents in accordance with prevailing regulations. Presenting solutions aimed at ensuring proper lodging, food and life of site employees. Implementation of occupational safety measures on the construction site.Second part of the diary:Students describe activities, technological processes and site technology observed during the field work, including appropriate descriptions, diagrams, and photographs.				
Exam literature	Additional:1. J. Klepac: Construction Management - Site Organization, Sveučilište u Zagrebu, Građevinski fakultet, 1982.2. J. Marušić: Construction Management, Sveučilište u Zagrebu, 1994.3. G. Bučar: Wood Working, Steel Bending and Concreting Operations on Construction Sites, Građevinski fakultet J.J. Strossmayera, Osijek.				
Knowledge evaluation	The field practice is an organized practical work for which students are prepared during auditory exercises. After completion of field practice, students are considered able to actively participate in on site activities.The second part of field practice is conducted as professional practical work forming part of final assignment.				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18575/65159	ECTS	17	Type	
Name	Final Thesis with Field Practice				
Status	6th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure)				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			240+300	(0+0+0+300+0)
Teachers	mr.sc. Petar Adamović prof.v.škole, Nositelj predmeta, Jagoda Bodić dipl.ing.arh.,				
Course objectives					
Knowledge and competences					
Values:	-				
Prerequisites:	Students cannot enroll in this course unless they have completed Hydraulic Structures Students cannot enroll in this course unless they have completed Water Supply and Sewerage I Students cannot enroll in this course unless they have completed Regulation and Amelioration Drainage Students cannot enroll in this course unless they have passed Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Public Roads II Students cannot enroll in this course unless they have completed Introduction to Railways				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18584/65395	ECTS	17	Type	
Name	Final Thesis with Field Practice				
Status	6th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			240+300	(0+0+0+300+0)
Teachers	mr.sc. Petar Adamović prof.v.škole, Nositelj predmeta, Jagoda Bodić dipl.ing.arh.,				
Course objectives					
Knowledge and competences					
Values:	-				
Prerequisites:	Students cannot enroll in this course unless they have completed Prefabricated Structures Students cannot enroll in this course unless they have completed Finishing Works Students cannot enroll in this course unless they have completed Building Installations I Students cannot enroll in this course unless they have completed Building Engineering I Students cannot enroll in this course unless they have passed Concrete Structures II Students cannot enroll in this course unless they have completed Introduction to Railways				
Proposal made by	()				



Code WEB/ISVU	18582/22388	ECTS	20	Type	
Name	Final Thesis with Field Practice				
Status	6th semester - Compulsory courses - Management in Civil Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			240+345	(0+0+0+345+0)
Teachers	mr.sc. Petar Adamović prof.v.škole, Nositelj predmeta, Jagoda Bodić dipl.ing.arh.,				
Course objectives					
Knowledge and competences					
Values:	-				
Prerequisites:	Students cannot enroll in this course unless they have completed Project Management and Legislation Students cannot enroll in this course unless they have passed Market and Business Environment Students cannot enroll in this course unless they have completed Conduct of Company Business Operations Students cannot enroll in this course unless they have completed Methodology and Management in Civil Engineering Students cannot enroll in this course unless they have completed Organization of Construction Site Students cannot enroll in this course unless they have completed Introduction to Railways				
Proposal made by	()				



Code WEB/ISVU	18571/22386	ECTS	5	Type	
Name	Finishing Works				
Status	5th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (6+0+0+90+24)	
Teachers	Sanja Lađarević dipl.ing.arh., Nositelj predmeta, Sanja Lađarević dipl.ing.arh., Nositelj predmeta, Sanja Lađarević dipl.ing.arh., Goran Poljanec ,				
Course objectives	Acquirement of knowledge about finishing works regarded as a phase in building construction, about materials, their use and installation.				
Knowledge and competences	After completion of this course, students will acquire knowledge and skills for competent participation in building construction.				
Values:	-				
How lectures are held	Finishing works for buildings, as well as materials, application and placement methods, are explained and illustrated by drawings of elements and details. To facilitate comprehension, students are required to make their own drawings during the lectures.				
How auditory exercises are held	Instructions for preparation of the graphical assignment				
How construction exercises are held	Preparation of graphical assignments with corrections and assistance from the lecturer.				
Course contents lectures	Introduction, notion of finishing works as a phase in building construction (2). Boundary structures/elements as a part of a complex system of vertical and horizontal parts of a building. Physical factors influencing formation of structural layers (4). External and internal factors as determinants for the selection of structures and materials. Functional and aesthetic requirements as a part of total solution to boundary system of a building. Use of appropriate materials at structural portions of a building (4). Multilayer walls, details of structural solutions (6). Closing openings: with wood, plastics, steel, aluminium; window and door details (4). Building protection against atmospheric influences - roof covering work, details of roof cover made of modern materials, water evacuation with steel sheet elements (4). Floors - selection of materials and details (3). Lining for ceilings - materials and details (3).				
Course contents auditory	Instructions for the preparation and presentation of graphical assignments or seminar papers (6).				
Course contents constructsures	Students individually solve complex details of buildings (24).				
Exam literature	Basic:1. M. Smoljanović: Lecture Notes, details.2. Đ. Peulić: Structural Elements of Buildings I and II, Tehnička knjiga, Zagreb, 1980 (selected chapters)Additional:3. Heinrich Schmitt: Hochbaukonstruktion.4. Martin Mittag: Civil Engineering Structures5. Manufacturers' brochures on modern construction materials				
Knowledge evaluation	Assignments: assignment submittal required for second signature.Examination (written and oral): in the scope of the written part of the examination, students are required to make a graphical representation relating to the course; comprehension of the topics presented during the course are verified during the oral examination.				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Concrete Structures II Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Building Elements II Students cannot enroll in this course unless they have passed Construction Materials				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18539/22354	ECTS	2	Type	
Name	Geodesy				
Status	3rd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+47 (8+0+0+32+7)
Teachers	dr.sc. Đuro Barković dip.ing.geod., Nositelj predmeta, Zdravko Kapović , Nositelj predmeta, dr.sc. Đuro Barković dip.ing.geod., dr.sc. Đuro Barković dip.ing.geod., dr.sc. Đuro Barković dip.ing.geod., Zdravko Kapović , Zdravko Kapović ,				
Course objectives	Students will acquire some fundamental information on geodesy, as well as some basic knowledge on geodesic activities that are used in civil engineering.				
Knowledge and competences	Students will be able to use geodetic plans and map as support documents for the design, to calculate lengths, angles and areas based on known coordinate points, to use theodolite for angle measurement, to use level to measure altitude differences, to use measuring tapes for direct measurement of length, to process and interpret measurement data.				
Values:	-				
How lectures are held	Lectures are given orally, with simultaneous writing and drawing on the blackboard. Presentations are given by means of notebook computer and projector. During the lectures, the lecturer asks questions and requires active participation of students in order to provoke them to make conclusions in the way they will be required to do in their practical work.				
How laboratory exercises are held	Field measurements.				
How construction exercises are held	Students perform measurements both individually and in teams.				
Course contents lectures	History and future of geodesy (1/2). Classification of geodesy (1/2). Geodetic measurements and instruments (1). Measurement uncertainty and adjustments (1). Coordinate systems and coordinate types (1). Basic calculation of coordinates (1). Geodetic networks (1). Geodetic measurement of land (1). Satellite positioning (1). Geodetic registers, plans and maps (1). Geoinformation systems (1). Application of geodesy in civil engineering (1). Geodetic activities at various stages of design and construction (1). Geodetic activities in various fields of civil engineering (1). Determination of areas and ground masses (1). Measuring displacement and deformation of civil engineering structures (1).				
Course contents auditory	Calculating angles and lengths from coordinate points (2). Oblique triangle calculation (2). Calculating altitude of points (2). Using coordinates to calculate area of objects (2).				
Course contents laboratory	Measurement with tape, theodolite and level (5)				
Course contents constructsures	Reading coordinates from topographical maps of a specified scale (2).				
Exam literature	Basic literature:1. Pribičević, B. and Medak, D. (2003), Geodesy in Civil Engineering, V.B.Z. d.o.o., Zagreb.2. Macarol, S. (1978): Practical Geodesy, Školska knjiga, Zagreb (pp: 11-20, 36-28, 38-67, 194-201, 619-624)Additional literature:1. Benčić, D. (2005): Measuring instruments and systems in geodesy and geoinformation science, Školska knjiga, Zagreb.				
Knowledge evaluation	Assignments: 2 assignments must be completed to obtain lecturer's second signature (1. cartography, 2. practical geodesy)Examination: The examination is twofold (written and oral). The written part of the examination consists of five problems. Knowledge from fields defined in the program of studies is tested during the oral part of the examination.				
Prerequisites:	Students cannot enroll in this course unless they have passed Mathematics I				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18538/22353	ECTS	5	Type	
Name	Geotechnical Engineering				
Status	4th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+122 (0+0+2+92+28)
Teachers	dr.sc. Sonja Zlatović , prof.v.šk., Nositelj predmeta, mr.sc. Željko Lebo dipl.ing.građ, mr.sc. Željko Lebo dipl.ing.građ, mr.sc. Željko Lebo dipl.ing.građ, dr.sc. Sonja Zlatović , prof.v.šk., dr.sc. Sonja Zlatović , prof.v.šk., dr.sc. Sonja Zlatović , prof.v.šk.,				
Course objectives	To develop ability to recognize geotechnical problems in civil engineering and solve some of them, to communicate with experts in geotechnical engineering.				
Knowledge and competences	Students learn to design a simple foundation, retaining wall, main elements of an excavation.				
Values:	-				
How lectures are held	At least one case history is used during each lecture to introduce a problem with plenty of photographs and videos of geotechnical objects in their building, life or collapse. Investigation sites are visited as well as constructions sites. Active Learning Critical Thinking frame is used. Notes are prepared rich with illustrations for each lecture.				
How auditory exercises are held	Problems are solved in the classroom. Active Learning Critical Thinking frame is used. Distant learning is used.				
How seminar exercises are held	Students prepare seminars in teams (2 persons) and present them for the whole group in order to exercise to research and report and to present to others.				
How construction exercises are held	Students solve individual assignments.				
Course contents lectures	Shallow foundations (2). Settlement evaluation, differential settlement (2). Bearing capacity (2). Euro Code 7 (2). Piles and deep foundations (2). Retaining structures (2). Gravity walls (2). Sheet-pile walls (2). Reinforced soil (2). Soil improvement (4). Deep excavations (4). Dynamic effects in soil (2). Embankments (2). Visits to interesting construction sites and geotechnical investigation sites.				
Course contents auditory	examples: 1. settlement evaluation for a given shallow foundation or given conditions, (2) bearing capacity (2). 2. gravity retaining wall design: actions and design situations, effects of water (6).				
Course contents seminars	students in pairs or triples choose a detail specially interested in; topics are offered by teacher, but choice of other topics is encouraged.				
Course contents constructs	1. shallow foundation design (8). 2. gravity retaining wall design (8)				
Exam literature	Basic literature:1. Euro Code 7: Geotechnical design2. Notes, exercises, materials http://line.tvz.hr/zlatovic 3. Zlatović,S, Materials for students in Croatian with English terms.4. Nonveiller,E: Soil Mechanics. Foundations. (in Croatian) Školska knjiga, Zagreb. 1979, 1981Additional literature:1. Nonveiller,E.: Klišenje i stabilizacije kosina, Školska knjiga, Zagreb, 1987, 204 str2. Lambe,T.W., Whitman,R.V.: Soil Mechanics, John Wiley Sons, Inc. , New York, 1969, 553 str3. Bowles,J.E.: Foundation Engineering Handbook, Van Nostrand Reinhold Co., New York, 1982, 752 str.4. Geoslope, student version, http://www.geo-slope.com/downloads/student.asp				
Knowledge evaluation	Assignments, two, prepared with solutions,Tests, three, 50% are required, with 75% of points: written examination is not necessaryExaminations: written part: problems, oral part: recognition of a problem, way to solution				
Prerequisites:	Students cannot enroll in this course unless they have completed Soil Mechanics Students cannot enroll in this course unless they have passed Construction Materials Students cannot pass this course unless they have passed Soil Mechanics				
Proposal made by	(05.10.2007)				



Code WEB/ISVU	18536/39030	ECTS	2	Type	
Name	German Language I				
Status	3rd semester - Elective courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+45 (0+0+0+30+15)
Teachers	Lidija Tepeš Golubić pred., Nositelj predmeta, Lidija Tepeš Golubić pred.,				
Course objectives	Acquiring competences in translating texts of the specialization. Achieving the A2 level by training skills, systematizing and developing competences in the field of general language and Grammar; achieving some elements of the B1 level according to the global Common European Framework of Reference for Language.				
Knowledge and competences	Acquiring the vocabulary and structures which conform with the elements of the A2 (and partly B1/B2) level. Acquiring the grammar skills needed for understanding the specialism texts. Listening and understanding, speaking (presentation, conversation) - A2 level; writing A2 level; reading and understanding (profession) by using dictionaries - B1/B2 level.				
Values:	-				
How lectures are held	The course is intercultural and interdisciplinary. Students are introduced to scientific and technical achievements of the people whose language they study (especially in the specialism area).				
How auditory exercises are held	The student does various types of exercises in auditory recitations, being continuously warned of cognitive, metacognitive and social and affective learning strategies which make individual learning easier. The student is trained for using dictionaries (bilingual, unilingual) and other manuals (in a traditional form or those mediated by electronic media), in order to be able to use manuals, professional literature, documentation and other knowledge sources in German, all related to the profession they are trained for. The student is trained for using various reading techniques, to write short summaries and use the basic business correspondence and to communicate about everyday issues.				
Course contents lectures	Sprachenportfolio, Neue Rechtschreibung (informativ), Anglizismen, ohne die es nicht geht (1). Wie wird man Bauingenieur(in)?, Bauingenieure haben ein weites Feld (2). Wie haben Erfindungen das Aussehen von Bauten verändert? (3). Der erste Wolkenkratzer, Hochhauskonstruktionen, Wie sicher sind Hochher? (4). Stellenanzeigen, Bewerbung, Vorstellungsgespr (1); Systematisieren und Erweitern von grammatischen Kenntnissen (Artikel; Pronomen (alle); Prsitionen; Negationen; Komparation, Prns, Prritum, Perfekt Aktiv und Passiv; Relativse; Imperativ; GekNebense) (4).				
Course contents auditory	Sprachenportfolio: Selbstbeurteilung (Self-assessment). Zusammenhendes Sprechen im Sinne von A1 und A2: Stellen Sie sich und Ihre Familie, Ihre Freunde vor; Tagesablauf; Kurzgespre im Sinnen von A1 und A2 (3). Arbeit mit dem Wrbuch (7). Verschiedene Aufgaben zum Gebrauch von Artikeln; Pronomen (alle); Prsitionen; Negationen; Komparation; Prns, Prritum, Perfekt Aktiv und Passiv; Relativsen; Imperativ; Gek Nebensen) (5)				
Exam literature	Basic literature:1. A. Kralj-Štih: Deutsch im BauingenieurwesenGrammar and Grammar Practice (mimeographed course materials for the Polytechnic students, revised byteacher Angelina Puović, various materials available on the Polytechnic Web sites)2. Magazines about all areas of civil engineering.Texts available on the Internet (teachers/students choice).Additional literature:1. Dictionaries (J. Kljajić, Njemačko-hrvatski praktični rječnik, Školska knjiga, Zagreb, 1998.; M. Uroić, A. Hurm, Hrvatsko-njemački rječnik, Školska knjiga, Zagreb, 1994.; V. Dabac, Tehnički rječnik njemačko-hrvatski, Školska knjiga, Zagreb, 1969.2. German gramars (I. Medić, Deutsche Grammatik fr jedermann, Školska knjiga, Zagreb, 2002.; T. Marčetić, Pregled gramatike njemačkog jezika, Školska knjiga, Zagreb, 2000.; Dreyer 00 Schmitt: Lehr- und bungsbuch der deutschen Grammatik, Verlag fr Deutsch 2002) M. Čičin-Šain Buljan, J. Kosanović, A. Štampalija, Poslovni njemački 1, Ekonomski fakultet, Zagreb, 1998.				
Knowledge evaluation	Preliminary written exam 1 and 2 (grammar skills and written translation of technical texts).Written and oral exam at the end of the fourth Semester.Preliminary written exams 1, 2 replace written exam.The oral exam includes three parts: 1. basic conversation on a given subject, 2. retelling of short texts, 3. translation of technical texts.				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18537/22351	ECTS	5	Type	
Name	German Language II				
Status	4th semester - Elective courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+120 (0+0+0+90+30)
Teachers	Lidija Tepeš Golubić pred., Nositelj predmeta, Lidija Tepeš Golubić pred.,				
Course objectives	Acquiring competences in translating texts of the specialization. Achieving the A2 level by training skills, systematizing and developing competences in the field of general language and Grammar; achieving some elements of the B1 level according to the global Common European Framework of Reference for Language.				
Knowledge and competences	Acquiring the vocabulary and structures which conform with the elements of the A2 (and partly B1/B2) level. Acquiring the grammar skills needed for understanding the specialism texts. Listening and understanding, speaking (presentation, conversation) - A2 level; writing A2 level; reading and understanding (profession) by using dictionaries - B1/B2 level.				
Values:	-				
How lectures are held	The course is intercultural and interdisciplinary. Students are introduced to scientific and technical achievements of the people whose language they study (especially in the specialism area).				
How auditory exercises are held	The student does various types of exercises in auditory recitations, being continuously warned of cognitive, metacognitive and social and affective learning strategies which make individual learning easier. The student is trained for using dictionaries (bilingual, unilingual) and other manuals (in a traditional form or those mediated by electronic media), in order to be able to use manuals, professional literature, documentation and other knowledge sources in German, all related to the profession they are trained for. The student is trained for using various reading techniques, to write short summaries and use the basic business correspondence and to communicate about everyday issues.				
Course contents lectures	Br Die grn Brder Welt (4). Das Beispiel eines Damms, Die Geschichte der Tunnelkonstruktionen, Tunnelbauverfahren (5). Der Stranbau (3). Der Flughafen, Flughafen in Frankfurt (3). Materialien und Arbeitstechniken (3). Trockenmauerwerk (2). Baumeister und Architekten: F. Hundertwasser, H. Boll#232;, G. Eifel, F. L. Wright (4). Stellenanzeigen, Bewerbung, Vorstellungsgespr (1); Systematisieren und Erweitern von grammatischen Kenntnissen (Deklination der Substantive, Adjektivdeklinationen, Konditional, Konjunktiv Prritum, Passiversatz, Rektion der Verben, Pronominaladverbien, Umformungen:Partizipialausdr#8592;#8594; Relativse) (5).				
Course contents auditory	Zusammenhendes Sprechen und Kurzgespre im Sinne von A1 und A2: Im Bm Hotel, Im Restaurant, Am Flugplatz (2). Arbeit mit dem Wrbuch und anderen Nachschlagewerken (15). Verschiedene Aufgaben zur (zu den/zum) Deklination der Substantive, Adjektivdeklinationen, Konditional, Konjunktiv Prritum, zum Passiversatz, Rektion der Verben, Pronominaladverbien, Umformungen: Partizipialausdr#8592;#8594; Relativse) (8). Presentation of seminar papers (5).				
Exam literature	Basic literature:1. A. Kralj-Štih: Deutsch im BauingenieurwesenGrammar and Grammar Practice (mimeographed course materials for the Polytechnic students, revised byteacher Angelina Puović, various materials available on the Polytechnic Web sites)2. Magazines about all areas of civil engineering.Texts available on the Internet (teachers/students choice).Additional literature:1. Dictionaries (J. Kljajić, Njemačko-hrvatski praktični rječnik, Školska knjiga, Zagreb, 1998.; M. Uroić, A. Hurm, Hrvatsko-njemački rječnik, Školska knjiga, Zagreb, 1994.; V. Dabac, Tehnički rječnik njemačko-hrvatski, Školska knjiga, Zagreb, 1969.2. German gramars (I. Medić, Deutsche Grammatik fr jedermann, Školska knjiga, Zagreb, 2002.; T. Marčetić, Pregled gramatike njemačkog jezika, Školska knjiga, Zagreb, 2000.; Dreyer 00 Schmitt: Lehr- und bungsbuch der deutschen Grammatik, Verlag fr Deutsch 2002) M. Čičin-Šain Buljan, J. Kosanović, A. Štampalija, Poslovni njemački 1, Ekonomski fakultet, Zagreb, 1998.				
Knowledge evaluation	Preliminary written exam 1 and 2 (grammar skills and written translation of technical texts).Written and oral exam at the end of the fourth Semester.Preliminary written exams 1, 2 replace written exam.The oral exam includes three parts: 1. basic conversation on a given subject, 2. retelling of short texts, 3. translation of technical texts.				
Prerequisites:	Students cannot enroll in this course unless they have completed German Language I Students cannot pass this course unless they have passed German Language I				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18523/22333	ECTS	2	Type	
Name	Historical Development of Civil Engineering				
Status	1st semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+30 (0+0+0+30+0)	
Teachers	dr.sc. Dražen Arbutina dipl.ing.arh., Nositelj predmeta,				
Course objectives	The aim of the course is to introduce students to principal terms used in the extensive field of civil engineering, with a particular emphasis on historic forms of structures/buildings, stylistic and typological properties of structures/buildings, development of structural systems, and construction methods used throughout the history of mankind.				
Knowledge and competences	After completion of the course, students will be prepared to work on historic buildings and monuments, and to recognize stylistic, physical and structural properties of historical buildings.				
Values:	-				
How lectures are held	The following topics will be examined in chronological order :architecture (sacral, sepulchral, profane and defence oriented buildings);urbanism and development of space (towns and other historic settlements, landscape cultivation, garden art);civil engineering (roads and transport systems, aqueducts and water facilities, municipal infrastructure, engineering structures, bridges, tunnels, etc.)General development of building practices in Europe and on other continents, including some significant examples from Croatia, will be presented, including also some general information about cultural, historical and artistic context of individual periods.				
Course contents lectures	1. INTRODUCTION (basic terminology: relationship between architecture, urbanism and civil engineering; relationship between building construction and civil engineering; relationship between the science, art and engineering; principal periodisation, styles, origin and development of structural forms and types) (1.0) PREHISTORY, PROTOHISTORY (1.0) 2. EGYPT (2.0) 3. MESOPOTAMIA (Sumer, Akkad, Babylonia, Assyria) (1.0) MEDITERRANEAN MIDDLE EAST (Kanan, Palestine, Phoenicia, Syria, Hittites) (0.5) PERSIA (0.5) 4. PREHELLENIC AEGEAN CIRCLE (Malta, Cyclades, Cyprus, Crete, Asia Minor (0.5) GREECE (1.5)5. ETRURIA (0.5), ROME (1.5) 6. EARLY CHRISTIAN PERIOD (0.75) BYSANT AND BYZANTINE CRICLE (Italy, Balkans, Asia Minor, Russia) (0.75) ISLAM (0.5) 7. PRE-ROMANESQUE PERIOD (0.5), ROMANESQUE PERIOD (1.5) 8. GOTHICS (2.0) 9. RENAISSANCE AND MANIRISM 10. BAROQUE, ROCOCO AND EARLY CLASSICISM (2.0) 11. 19TH CENTURY AND EARLY 20TH CENTURY (Biedermeier, Historicism, Secession, Art Deco, Late Academism) (2.0). 12. 20TH CENTURY (early Modern Style, modern construction after the second world war, present-day construction) (2.0) 13. ANCIENT EXTRA-EUROPEAN CULTURES (India, Chine, Indochina, Japan, Africa, Oceania, Australia, North, Central and South Americas) (2.0) 14. TRADITIONAL 8POPULAR) CONSTRUCTION PRACTICES (2.0) 15. PROTECTION OF CULTURAL HERITAGE AND BASIC PRINCIPLES USED IN RENOVATION OF HISTORIC BUILDINGS (2.0)				
Exam literature	Basic:Z. KARAČ: Historic Development of Civil Engineering (internal lecture notes), Zagreb, 2005.J.J. NORWICH, N. PEVSNER: Great Architectures of the World, Zagreb, 1981.Additional:S. GIEDION: Space, time, architecture, Belgrade 1969; L. MUMFORD, Town in history, Zagreb, 1988; B. MILIĆ, Development of tows over centuries I-III, Zagreb, 1991-1995-2002; W. MULLER, G. VOGEL, Architecture Atlas I-II, Zagreb, 1999-2000; K. FREMPTON, Modern Architecture, Kritička povijest, Zagreb, 1992, H.W. JANSON, History of Art, Varaždin, 2003, R. IVANČEVIĆ, Artistic heritage in Croatia, Motovun, 1986; A. FREUDENREICH, How the people build?, Zagreb, 1972; T. MARASOVIĆ, Active Approach to Architectural Heritage,, Split, 1985, M. SCHREIBER; Road symphony, Zagreb, 1961; J. RADIĆ Bridges, Zagreb, 2003; A. MOHOROVIČIĆ: Construction in Croatia, Zagreb, 1992.				
Knowledge evaluation	The written part of the examination consists of the test (written and graphical). The oral examination is taken on student request only (to obtain a better grade).				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18560/22375	ECTS	4	Type	
Name	Hydraulic Structures				
Status	5th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure)				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+90 (9+0+0+75+6)
Teachers	Željko Pavlin dipl.ing.grad., Nositelj predmeta, Marko Pršić, Nositelj predmeta, Berislav Rupčić, Berislav Rupčić,				
Course objectives	Gaining basic theoretical knowledge on hydraulic structures and practical skills for participation in project development process.				
Knowledge and competences	Acquiring knowledge on elementary sizing of hydraulic structures (stability, spillways).				
Values:	-				
How lectures are held	Lectures performed with aid of modern technical equipment and accompanied by printoffs with most important illustrations. Following lectures, students get assignments to motivate them to follow and understand the subject matter dealt with in lectures.				
Course contents lectures	Lectures Overview of marine structures (2), Sea wave - theory, forecasts, design waves, sea levels (5), Design of typical marine structures (5), Maritime construction technology (3), Flood waves theory and forecasts (2) Inflow regulation - demand and types, purpose, components and sizing of reservoirs, dikes (4), Overview of main groups of hydraulic structures (3), Investigation works (2), Dams, dikes and water evacuation structures (4).				
Course contents auditory	Breakwater stability (2), Breakwater concept (3), Gravity dam stability (1), Spillway calculation (1), Bottom outlet calculation (1), Run-off-the-river plant output calculation (1)				
Course contents constructsures	Individual preparation of two programs from the following areas: Breakwater stability (2), Gravity dam (2), Spillway/outlet calculation (2)				
Exam literature	Basic:0P. Stojić: Hidrotehničke građevine I i II, FGZ Split, 1997., 1998. (Hydraulic Structures)0Z. Tadejević, M. Pršić: Pomorska hidraulika I, skripta Građevinskog fakulteta, Zagreb, 1981. (Marine Hydraulics)0M. Pršić, Z. Tadejević: Riječni plovni putevi, skripta Građevinskog fakulteta Zagreb, 1988. (Navigable Riverways)0Separati koje priprema nastavnik za studente (Printoffs prepared by lecturer)Additional:0B. Đorđević: Korištenje vodnih snaga I i II, Naučna knjiga, Beograd, 1981., 1984. (Use of Hydropower)0P. Stojić: Hidroenergetika, FGZ Split, 1995 (Hydropower Management)0Ž. Vuković: Osnove hidrotehnike I/1 i 2, Akvamarine, Zagreb, 1994., 1995. (Elementary Hydraulic Engineering)0Tehničar - Građevinski priručnik, Građevinska knjiga, 1985. (Civil Engineering Manual)				
Knowledge evaluation	After-class assignments Design exercises (prepared exercises for signature appending) Preliminary exams (min. 40% za signature, with average 55% score exempt from written exam) Written exam consists of theoretical questions. Oral exam includes explanation of phenomena and solving exercises in the field covered by the course in order to prove understanding of subject matter.				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have passed Introduction to Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Introduction to Hydraulic Structures Students cannot enroll in this course unless they have completed Hydrology and Hydraulics Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design Students cannot pass this course unless they have passed Introduction to Hydraulic Structures				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18557/22372	ECTS	5	Type	
Name	Hydrology and Hydraulics				
Status	4th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure) 4th semester - Compulsory courses - Civil and Environmental Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+121 (12+0+6+91+12)	
Teachers	dr.sc. Mladen Petričec dipl.ing.grad., Nositelj predmeta, Ivana Ivanković , Ivana Ivanković , Davorin Žugčić , Davorin Žugčić ,				
Course objectives	Recognizing and independent task-solving in the fields of hydrology and hydraulics in the process of problem-solving related to water management.				
Knowledge and competences	Knowledge necessary to independently solve tasks related to processing meteorological and hydrological measurements and determination of characteristic flows as input component for sizing of hydraulic structures.				
Values:	-				
How lectures are held	Water flow patterns and methodology of calculating values related to water flow explained on examples and graphic representations. Graphic representations and photographs will give insight into the characteristics of water works. During lectures students are motivated to participate by questions and explanations.				
How auditory exercises are held	Problem-solving on the blackboard, with active participation of students. A planned visit to practical examples of characteristic hydraulic structures and a hydraulic laboratory (Faculty of Civil Engineering and/or Croatian Institute of Civil Engineering).				
How construction exercises are held	As part of design exercises, a preparation of two programs is planned.				
Course contents lectures	Hydrometric measurements and collected data processing (3), River basin drainage (2). Urban drainage (2) Hydrological processes in watercourses (2) Mathematical statistic calculations (3). Water flows in pressure systems (3), Water flows in open watercourses (3) Overflow and seepage through water works (2) Hydraulic jump and connecting of water levels (2) Hydraulic measurements and data processing (2). Groundwater flows (3) Protection of building pit from groundwater (2). Introduction to physical modelling (1).				
Course contents auditory	Examples of drainage calculations (2) Determination of flow curve and distribution of characteristic flows (3). Examples of stationary flow under pressure (2) Calculations of stationary uniform flow in open watercourses (2) Calculation of river deposit flow in watercourses (1) Calculation of seepage, overflow and hydraulic jump (2). Calculation of flow towards wells in porous environments under specific boundary conditions (2) Calculation of building pit protection (1).				
Course contents constructs	Preparation of two programs from the following areas: calculation of water tables of stationary flows, calculation of overflow/seepage and hydraulic jump, calculation of flow in a pressure system, calculation of groundwater flow towards wells.				
Exam literature	Basic literature:1. Živko Vuković: Osnove hidrotehnike I/1, Akvamarine Zagreb, 1996. (Introduction to Hydraulic Engineering I/1)2. Ranko Žugaj: Hidrologija, RGN fakultet, Zagreb 2000. (Hydrology)3. M. Pršić, G. Gjetvaj: Interna skripta, Zagreb 2003. (Internal Course Materials)Additional literature:1. Dionis Srebrenović: Primijenjena hidrologija, Tehnička knjiga, Zagreb, 1986.(Applied Hydrology)2. I. Agroskin i suradnici: Hidraulika, Tehnička knjiga, Zagreb, 1973. (Hydraulic Engineering)				
Knowledge evaluation	Preliminary exams/tests (minimum 25% for signature appending and 60% for exemption from written exam). Written exam for students who have not passed preliminary exams (definitions of terms and phenomena from lectures and task-solving). Oral exam: based on preliminary exam results or over 60% in written exam.				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have completed Introduction to Hydrology and Hydraulics Students cannot pass this course unless they have passed Introduction to Hydrology and Hydraulics				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18529/39869	ECTS	2	Type	
Name	Introduction to Hydraulic Structures				
Status	4th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+45 (15+0+0+30+0)
Teachers	Željko Pavlin dipl.ing.grad., Nositelj predmeta, Željko Pavlin dipl.ing.grad., Diana Šustić , Diana Šustić ,				
Course objectives	Gaining insight into the significance and role of hydraulic engineering in water management, types of structures and their design.				
Knowledge and competences	Students gain ability to recognize water management problems and to participate in design and construction of water works.				
Values:	-				
How lectures are held	Students are gradually introduced to the basics of water management structures through graphic presentations, photographs and explanations.				
How auditory exercises are held	Through a carefully selected set of tasks students are taught basic calculations of elements for individual water works, which were dealt with during lectures.				
Course contents lectures	Water supply structures (3). Sewerage structures (2). Wastewater treatment plant structures (4). Regulation structures (5). Amelioration structures (4). Inland navigation structures (3). Marine, coastal and tidal structures (5). Use of hydropower and hydropower facilities (4)				
Course contents auditory	Solving examples of sanitary engineering. (3). Introduction to sizing of economic hydroengineering structures (4). Calculation of influent quantities on regulation structures (3). Sizing of basic elements of riverine and marine engineering (3). Basic parameteres for calculation of hydropower plant types (2).				
Exam literature	Basic:- Ž. Vuković: Osnovi hidrotehnike I/1 i I/2, 1996. 00 Zagreb (Introduction to Hydraulic Engineering) - Tehničar 6 00 grad. priručnik, 1989. 00 Beograd (Civil Engineering Manual) Additional: - Ivan Gulić: Opskrba vodom, DGHI 00 Zagreb (Water Supply) - Abwassertechnik, I i II - Petar Stojić: Hidroelektrane (Hydropower Plants)				
Knowledge evaluation	Two preliminary exams per semester (25% for signature appending and 60% for exemption from written exam). Oral exam, if the candidate scores 60% in the written exam				
Remark	Possible graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have completed Introduction to Hydrology and Hydraulics				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18530/39870	ECTS	4	Type	
Name	Introduction to Hydrology and Hydraulics				
Status	3rd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+90	(12+0+3+75+0)
Teachers	dr.sc. Mladen Petrićec dipl.ing.grad., Nositelj predmeta, dr.sc. Mladen Petrićec dipl.ing.grad.,				
Course objectives	Qualifying students to recognize the basic principles of water flow and status and to solve simple problems in the fields of hydrology and hydromechanics.				
Knowledge and competences	Acquiring basic skills related to independently solving problems of runoff and water balancing, hydrostatics, flow in pipes and watercourses and seepage in porous environment.				
Values:	-				
How lectures are held	Lectures on occurrence and flow of water in the nature and water balancing will be explained on simple examples and graphic presentations. Graphic representations and photographs will give insight into basic instruments and equipment for measurements of rainfall quantities and flow in watercourses. Basic hydraulic terminology is explained with aid of modern tools, graphic materials and photographs. During lectures students are motivated to participate by asking questions and requiring explanations.				
How auditory exercises are held	Tasks are solved on the backboard, with active student participation. Planned visit and learning about the tasks of the State Hydrometeorological Service and the work of a hydraulic engineering laboratory (Faculty of Civil Engineering and/or Croatian Institute of Civil Engineering).				
Course contents lectures	Water and water resources, physical characteristics of water (1). Water cycles in the nature, runoff, flow in watercourse bed, flow of water through porous environment. (2). Monitoring and measurement of meteorological and hydrological phenomena and their characteristics (2). Pressure diagrams and water pressure (3). Types of movement, velocity, acceleration and law of conservation of mass (1). Quantity of conservation movement, flow under pressure (2). Flow in open watercourse (2) Groundwater flows and intakes (2),				
Course contents auditory	Examples of evapotranspiration calculation, average rainfall in a basin and design rainfall intensity (3). Determination of pressure diagram and water pressure on structures (3). Calculation of velocity and acceleration, quantity of motion (1) Examples of stationary flow under pressure (3). Determination of specific energy of profile and calculation of stationary uniform flow in open watercourse (3). Examples of laminar seepage and fully penetrating wells under pressure and free water table (2).				
Exam literature	Basic: Živko Vuković: Osnove hidrotehnike I/1, Akvamarine Zagreb, 1996. (Introduction to Hydraulic Engineering) Ranko Žugaj: Hidrologija, RGN fakultet, Zagreb 2000. (Hydrology) Lecture printoffs Additional: Dionis Srebrenović: Primijenjena hidrologija, Tehnička knjiga, Zagreb, 1986. (Applied Hydrology) I. Agroskin i suradnici: Hidraulika, Tehnička knjiga, Zagreb, 1973 (Hydraulic Engineering)				
Knowledge evaluation	Two preliminary exams (minimum 25% for second signature; 60% for exemption from written exam). Written exam: short explanations of definitions and phenomena from lectures and task-solving. Oral exam: based on preliminary exam results or 50% scored in written exam.				
Prerequisites:	Students cannot enroll in this course unless they have passed Descriptive Geometry in Civil Engineering I Students cannot enroll in this course unless they have completed Elementary Geology Students cannot enroll in this course unless they have passed Mathematics I Students cannot pass this course unless they have passed Elementary Geology				
Proposal made by	(09.09.2008)				



Code WEB/ISVU	18542/22357	ECTS	1	Type	
Name	Introduction to Physical Planning				
Status	4th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+15 (0+0+0+15+0)
Teachers	dr.sc. Dražen Arbutina dipl.ing.arh., Nositelj predmeta,				
Course objectives	Introduction to basic principles of the physical planning profession. Introduction to the theory of physical planning, and to practical problems related to planning and development of greater areas (regions).				
Knowledge and competences	Definition of physical planning. Man and space. Functional properties and processes in space. Primary and secondary urban development. Geographic prerequisites for the location and developments of towns. Traffic/geographic prerequisites for the location of towns. Urban functions of town districts. Urban agglomeration, conurbation and megalopolis. Region. Principal generators of modern structure of space. Transport-generated opening, industrial areas, tourist regions, agricultural areas. Landscape and identity of space. Effects of human action on the appearance of landscape and significant preservation principles. Impacts on natural environment and protection of space. Areas with special properties: natural reserves, national and memorial parks. Methods and technologies for the preparation of physical plans. Physical plans and practical problems relating to the preparation and implementation of physical plans.				
Values:	-				
How lectures are held	Each topic starts with theoretical explanations, after which possible practical applications - backed by appropriate examples - are presented. Slide projections are often used to illustrate topics covered during the course.				
Course contents lectures	1.Definition of physical planning.2.Man and space. Processes in space.3.Primary and secondary urban development, village, town.4.Geographic prerequisites for positioning and development of towns.5.Traffic/geographic prerequisites for positioning and development of towns, and for population growth6.Urban functions of town districts.7.Urban agglomeration, conurbation and megalopolis.8.Traffic, its significance and traffic-generated opening.9.Industry and industrial areas.10.Tourism and its influence on space.11.Agricultural and forest land.12.Environmental impacts. Impacts in coastal areas.13.Protection of space. Areas with special properties: natural reserves, memorial parks and national parks.14.Method and technology for the preparation of physical plans.15.Practical problems during preparation and implementation of physical plans.				
Exam literature	Basic:0Marinović-Uzelac: Physical Planning, Zagreb 2001.0Milan Vresk: City and Urbanization, Školska knjiga, Zagreb, 2002.0Marinović-Uzelac: Settlements, Towns, Areas, Tehnička knjiga, Zagreb, 1986.Additional:0Milan Vresk: City in Urban and Regional Planning, Školska knjiga, Zagreb, 1990.0Crkvenčić et al: Central Settlements in SR Croatia, Školska knjiga, Zagreb, 1976.				
Knowledge evaluation	preliminary examinations (1-2 during the semester); students that pass these examinations will not be required to take the corresponding portions of the final examination.written examination (in form of a written test)* Examination may be taken together with that for the course "Introduction to Urban Planning" so as to reduce the overall number of examinations to be taken by students.				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18554/22330	ECTS	2	Type	
Name	Introduction to Railways				
Status	5th semester - Compulsory courses - Management in Civil Engineering 5th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure) 5th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+30 (0+0+0+30+0)	
Teachers	mr.sc. Ante Goran Bajić viši predavač, Nositelj predmeta,				
Course objectives	Students will acquire theoretical, practical and operative knowledge about the construction and maintenance of railways and railway systems, and will visit major railway construction sites and plants.				
Knowledge and competences	After completion of the course, students will be able to participate in the construction and maintenance of railways and railway plants.				
Values:	-				
How lectures are held	Theoretical lectures during which appropriate teaching aids are used (slide projector, overhead projector and video recorder), and visit of major railway construction sites and plants.				
Course contents lectures	Introduction and general properties of railways. Transport. Transportation facilities (classification). Historic development of railways. Classification of railways. Loading gauge. Railway clearance. Wheel trim geometry. Rentability of railways (2).Type of traction. Principal characteristics (advantages and shortcomings), steam locomotive, electric locomotive, and diesel locomotive (2).Railway elements: (classification of railways, track width, number of tracks, organization of traffic on a single track line and double track line, horizontal curve, vertical alignment, maximum longitudinal grade) (2).Train stations (classification, tracks, signals, equipment used in passenger and freight stations (2).Forces acting on the track (static and dynamic - vertical and horizontal).Permanent way elements:1. Rails: Production. Marks. Quality of steel. Types. Rails during use. Breakdown. Fatigue. Wear (2).2. Rail accessories: Fastening accessories. Problems. Structural solutions (Germany, France, England). Technical, operational, economic and other properties. Connection accessories. Glued insulating joint. Small accessories. Safety caps. Rail travel blocking devices (2).3. Sleepers: Steel sleepers. Advantages and shortcomings. Reinforced-concrete sleepers. Advantages and shortcomings. Wooden sleepers. Advantages and shortcomings. Fabrication, durability, and protection (2).4. Ballast: Objectives. Prism dimensions. Thickness. Materials. Ballast. Grain size and shape. Contamination. Screening (2).5. Special track accessories (points, turntables, travelling platforms, triangles) (2).Track layout in straight line and in curve. (Track in straight line - width, height, direction, regulations. Track in curve. Transition curves. Widening. Superelevation ramps. Generation of non-annulled lateral acceleration and three formulas for track superelevation. Track orientation - regulations. Direction arrows. Rectification methods for horizontal curves. Three-point method (3).Track inspection. Control of geometry. Inspection of individual elements. General inspection of the track (2).Track maintenance and repair. Regular maintenance. Periodic maintenance. Overhaul. Railway repair shed organization and schematic representation. Repair of track substructure. Replacement train. Track maintenance works. Track welding. AT weld. ET weld. Advantages and shortcomings. Comparison (4).Continuous welded rail: Advantages. Temperature and forces in continuous rail. Longitudinal resistance - p. Lateral resistance - w. Alleviating internal stress from continuous rails. Three stress alleviation methods (track lifting) (2)Special railways (1)				
Exam literature	Basic:1. Pollak, B.: Railways, Građevinski institut, FGZ, Zagreb, 1988.2. Marušić, D.: Design and Construction of Railways, Građevinski fakultet Sveučilišta u Splitu, 1994.3. Bajić, A.G.: Lecture OffprintsAdditional:P-314 Byelaw on Permanent Ways, Hrvatske željeznice, Zagreb.P-315 Byelaw on Track Substructure, Hrvatske željeznice, Zagreb.				
Knowledge evaluation	written part of the examinations (theory - 10 questions),oral part of the examination (may be taken only by students who acquired at least 60 points during the written part of the examination)				
Prerequisites:	Students cannot enroll in this course unless they have passed Descriptive Geometry in Civil Engineering II Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18541/22356	ECTS	1	Type	
Name	Introduction to Urban Planning				
Status	4th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+15 (0+0+0+15+0)
Teachers	dr.sc. Dražen Arbutina dipl.ing.arh., Nositelj predmeta,				
Course objectives	The aim of the course is to teach students about basic elements of physical planning activities and to explain professional connection between civil engineering activities on the one side, and the planning process and space management, on the other.				
Knowledge and competences	After completion of this course, students will become qualified to perform basic associate engineer's tasks during preparation of space planning documents (particularly in the field of transport and water infrastructure), and to deal in a fully qualified manner with operative design and construction situations related to construction/urban planning regulations.				
Values:	-				
How lectures are held	Lectures are organized as a double methodical block where the theme of the lecture is presented theoretically in the first part of every lecture, while in the second part of the lecture the theme is explained from the practical standpoint, through actual problematic situations that are likely to occur in practical work. In this part of the lecture, students are encouraged to discuss the issue and to ask questions and, whenever necessary, they are informed about correlation between particular topics presented in this course and those presented in other courses included in the academic program for civil engineering.				
Course contents lectures	1) Introductory theses (space, town, physical planning activities, basic professional relationships, interdisciplinarity in planning); 2) Development of towns I (Antiquity and the Middle Ages); 3) Development of towns II (Modern Age and present-day urbanism); 4) Town planning and civil engineering regulations (laws, administrative documents, technical documentation, plan elaboration procedure, subjects participating in plan elaboration); 5) Space management (space management instruments, real property ownership, land rent, contribution for utility services, etc.); 6) Cartographic data and plan types (survey documents, cadastre, GIS, etc., hierarchy of spatial and urban plans; types, scales, graphics, preparation procedure, and approval); 7) Regional development plan (level: state, counties, municipalities; system of settlements; transport system, natural environment; activities in space; population); 8) General urban development plan (functional town zoning, urban structure, matrix, microuban elements); 9) Detailed urban development plan I - Residential zones in towns (individual housing zones, collective housing zones, amenities); 10) Detailed urban development plan II - Transport in urban areas (rural transport terminals, urban transport network, transport corridor profile, parking, public transportation in urban areas); 11) Municipal infrastructure (water and power infrastructure facilities, municipal level hygiene, municipal zones, municipal system management); 12) Urban area aesthetics (urban composition, public space in urban areas with improvement and equipment, parks and green spaces); 13) Urban reconstruction and renewal of urban heritage; Elements of urban sociology; 14) Ruralism - planning and development of rural settlements and spaces; Environmental protection in physical and urban planning (fire, earthquake, floods, landslides, war, noise, pollution...); 15) Zagreb - urban problems; synthesizing interpretation and discussion.				
Exam literature	Basic:Milić, B: Development of towns through centuries I-III, Zagreb, 1994-2002; Pegan, S.; Urbanism I (internal lecture notes, Faculty of Architecture), Zagreb, 1997; Pegan, S; Municipal technique in towns (internal lecture notes, Faculty of Architecture), Zagreb, 1996; Pegan, S; Basic elements of urban and civil engineering legislation (internal lecture notes, Faculty of Architecture), Zagreb, 1999; Marinović-Uzelac, A.; Physical planning, Zagreb, 2001; Krier, R; Urban space, Belgrade, 1991.Additional:Marinović-Uzelac, A; Social space in towns, Zagreb, 1978; Marinović-Uzelac, A.; Settlements, towns, spaces, Zagreb, 1986; Marinović-Uzelac, A.; Theory of space use in urban planning, Zagreb, 1989; Čaldarović, O.: Urban sociology, Zagreb, 1985; Simonović, Đ; Improvement of rural territories and settlements, Belgrade, 1980; Klepac, R.; Basic elements of environmental protection, Zagreb, 1988; Linč, K; Image of a city, Belgrade, 1974; Castex, J.; Urban forms, Belgrade, 1989; Cušen, G; Town landscape; Belgrade, 1990; Rowe, C. -Koetter, F.; Town collage, Belgrade, 1988; Halprin, L. Towns, Belgrade, 1974; Rojić, M.; Cadastre of real property (internal lecture notes, Faculty of Geodesy), Zagreb, 2002; Lovrić, P.; Cartography, Zagreb, 1978, Traffic in urban areas , Belgrade, 1975.				
Knowledge evaluation	preliminary examinations (1-2 during the semester); if passed the student does not need to take the corresponding part of the final examination.written part of the examination is a written test.* the examination may be combined with the course "Introduction to physical planning", so as not to increase the number of obligatory examinations.				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18552/22368	ECTS	5	Type	
Name	Market and Business Environment				
Status	4th semester - Compulsory courses - Management in Civil Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120	(15+0+0+105+0)
Teachers	mr.sc. Časlav Dunović , viši predavač, Nositelj predmeta, mr.sc. Časlav Dunović , viši predavač,				
Course objectives	The aim of the course is to teach students to acquire theoretical knowledge and practical skills for the successful management of companies, taking into account all relevant influences of market and market environment.				
Knowledge and competences	Knowledge needed for proper understanding of market and business environment in which the company operates, identification of market requirements (demand and supply), and structuring the company in a way enabling successful operation.				
Values:	-				
How lectures are held	Appropriate teaching aids (video projector and computer) will be used to present, in an appropriate way, topics covered during the course.				
How auditory exercises are held	Cases from real life are analyzed, and instructions are given as necessary for preparation of the seminar paper.				
How seminar exercises are held	The final result of auditory exercises is the seminar paper. Every student independently prepares a seminar paper relating to a particular type of production.				
Course contents lectures	Business environment, notion of earning (2). Economic development indicators, factors influencing economic development (2). Technical structure of economy (2). Company, entrepreneur, entrepreneurship (2). Notion of company and its functions (2). Entrepreneur (2). Entrepreneurship, its meaning and role in construction industry (2). Company policies, establishment of policies, influence factors (2).Market, notion, function, structure (2). Market research, supply and demand (2). Law of supply and demand, reproduction process (2). Reproduction flow, input, output (2). Forms of investment in reproduction (2). Costs and calculations, supply, sale (2). Business success and business success indicators (2).				
Course contents auditory	A real practical case is considered: the market for products produced by the company is analyzed, the reproduction flow is established, costs are analyzed, and elements for the determination of success are commented.				
Course contents seminars	Each students independently analyzes a concrete case - some kind of production - in accordance with auditory exercises, and submits a report in form of a seminar paper.				
Exam literature	Basic:1. D. Grubišić, Business Economy, Ekonomski fakultet Sveučilišta u Splitu, Split 2004. Additional:1. J.E. Manser, Economics - a foundation course for the built environment, EFN Spon, London, UK, 1995.				
Knowledge evaluation	- presentation of seminar paper- oral examination (only for students who successfully presented the seminar paper)				
Remark	Preparation of final paper is not possible.				
Prerequisites:	Students cannot enroll in this course unless they have passed Descriptive Geometry in Civil Engineering I Students cannot enroll in this course unless they have passed Sociology of Work Students cannot enroll in this course unless they have passed Engineering Mechanics Students cannot enroll in this course unless they have passed Mathematics I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18517/22319	ECTS	7	Type	
Name	Mathematics I				
Status	1st semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			45+165 (45+0+0+120+0)	
Teachers	dr. sc. Tin Perkov dipl. ing. mat., Nositelj predmeta, Mandi Orlić prof. mat., dr. sc. Tin Perkov dipl. ing. mat., dr.sc. Salih Suljagić prof. v. sk., Vera Žic dipl.ing.mat.,				
Course objectives	Achieving basic knowledge and skills in Vector Algebra and Differential Calculus of Real Functions of a Single Variable.				
Knowledge and competences	Operations with Complex Numbers. Dot and Cross Products of Vectors. Orthogonal Projection of Vector onto Straight Line and Plane. Testing Convergency of Sequencies and Series of Numbers. Sum of Geometric Series. Finding a Limit of a Function. Studying Different Characteristics of Real Function of a Single Real Variable by Means of Differential Calculus.				
Values:	-				
How lectures are held	Delivering on the blackboard, involving students in the discussion whenever it is Student group size possible.				
How auditory exercises are held	Solving examples and exersizes relevant to the delivered material.				
Course contents lectures	Real Numbers. (2) Coordinate Systems in Plane and Space. (1) Complex Numbers. (3) Determinants of 2nd i 3rd Order. (1) Systems of Linear Algebraic Equations. Cramer Rule. Gaussian Elimination Method. (2) Definition of a Vector. (1) Dot Product and Orthogonal Projection. (2) Cross Product and Triple Scalar Product. (3) Application of Vector Algebra to Space Geometry. (3) Sequencies and Series of Numbers. (3) The Notion of a Real Function of a Single Real Variable. (1) Algebraic Functions. (2) Transcendental Functions. (3) Limits and Continuity of Functions. (2) Derivative of a Function and Rules of Differentiating. (3) Differentiating of Functions. (3) Differential. (1) Derivatives of Higher Order. (2) Basic Theorems of Differential Calculus. (3) Application of Differential Calculus. (4)				
Course contents auditory	Real Numbers. (2) Coordinate Systems in Plane and Space. (1) Complex Numbers. (3) Determinants of 2nd i 3rd Order. (1) Systems of Linear Algebraic Equations. Cramer rule. Gaussian Elimination Method. (2) Dot Product of Vectors. (2) Orthogonal Projection. (2) Cross Product and Triple Scalar Product. (2) Application of Vector Algebra to Space Geometry. (3) Sequencies of Numbers. (2) Series of Numbers. (2) Algebraic Functions. (3) Transcendental Functions. (3) Limits and Continuity of Functions. (3) Differentiating of Functions. (3) Tangent, Normal Lines and Angle between Curves. (2) Differential and Approximate Calculating. (2) Derivatives of Higher Order. (2) L'Hopital's Rule. (1) Application of Differential Calculus to Studying Functions. (5)				
Exam literature	Basic literature:1. S. Suljagić: Mathematics I (in Croatian), on Internet addresses http://tesla.vtszg.hr/suljagic i http://nastava.tvz.hr/ssuljagic Additional literature:1. L.Krnić, Z. Šikić: Differential and Integral Calculus, (in Croatian) Školska knjiga, Zagreb, 1992.2. N. Elezović: Linear Algebra, (in Croatian) Element, Zagreb, 1995.3. B.P.Demidović: Problems and Solved Problems in Higher Mathematics with Applications to Engineering, Tehnička knjiga,1978.4. N. Elezović, A. Aglič: Problems in Linear Algebra, (in Croatian) Element, Zagreb, 1995.5. Ž. Pauše: Exam Questions in Mathematics for Students of Engineering Studies, (in Croatian) Školska knjiga, Zagreb, 1995.6. Ž. Pauše: Mathematical Handbook 1, (in Croatian) Školska knjiga, Zagreb, 2003.7. Ž. Pauše: Mathematical Handbook 2, (in Croatian) Školska knjiga, Zagreb, 2004.				
Knowledge evaluation	Tests: 1. Real and Complex Numbers; 2. Vectors; 3. Functions, Sequencies, Series; 4. Differentiating and Applications. Za drugi potpis at least 40%, for passing written part of the exam at least 60% of points.Examinations: consists of written and oral part. Each of them are eliminatory. Written part contains solving problems. Oral part contains discussion on the used method in solving problems.				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18524/22342	ECTS	7	Type	
Name	Mathematics II				
Status	2nd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			45+165	(36+9+0+120+0)
Teachers	dr. sc. Tin Perkov dipl. ing. mat., Nositelj predmeta, Mandi Orlić prof. mat., Mandi Orlić prof. mat., dr. sc. Tin Perkov dipl. ing. mat., dr. sc. Tin Perkov dipl. ing. mat., dr.sc. Salih Suljagić prof. v. sk., Vera Žic dipl.ing.mat., Vera Žic dipl.ing.mat.,				
Course objectives	Achieving basic knowledge and skills in Integrals and Integration of Functions of a Single Variable, Matrix Operations, Ordinary Differential Equations and some Numerical Methods.				
Knowledge and competences	Methods of Integration, Application of Integration, Solving Linear Systems, Matrix Operations, Determinants, Solving Differential Equations, Numerical Integration, Using Bisection Method and Newton's Method in solving equations, Finite Difference Method for Ordinary Differential Equations.				
Values:	-				
How lectures are held	Delivering on the blackboard, with involving students in discussion whenever possible.				
How auditory exercises are held	Solving examples and exercises on the blackboard.				
How laboratory exercises are held	Solving problems, using computer program Mathematica, in computer laboratory.				
Course contents lectures	Area and the Definite Integral. (2) The Fundamental Theorem of Calculus. (2) Methods of Integration. (4) Definite Integral. (3) Application of Integration. (6) Matrix Operations, Determinants. (4) Systems of Linear Equations. (2) Rank of Matrix. (3) Ordinary Differential Equations (Separation of Variables). (4) Linear Differential Equations. (4) Bisection Method and Newton's Method. (4) Least Squares Method, Lagrange's Interpolation. (2) Numerical Integration. (2) Numerical Solutions of Ordinary Differential Equations. (3)				
Course contents auditory	Methods of Integration. (11) Application of Integration. (6) Matrix Operations. (3) Solving Determinants. (2) Solving Linear Systems. (3) Rank of Matrix. (2) Ordinary Differential Equations (Separation of Variables). (3) Linear Differential Equations. (3) Numerical Methods. (3)				
Course contents laboratory	Numerical solving equations, Approximation and interpolation, Numerical integration, Solving differential equations numerically, using computer program Mathematica in computer laboratory.				
Exam literature	Basic literature:1. S. Suljagić: Mathematics I (in Croatian), on Internet addresses http://tesla.vtszg.hr/suljagic i http://nastava.tvz.hr/ssuljagic Additional literature:1. L.Krnić, Z. Šikić: Differential and Integral Calculus, (in Croatian) Školska knjiga, Zagreb, 1992.2. N. Elezović: Linear Algebra, (in Croatian) Element, Zagreb, 1995.3. B.P.Demidovič: Problems and Solved Problems in Higher Mathematics with Applications to Engineering, Tehnička knjiga,1978.4. N. Elezović, A. Aglič: Problems in Linear Algebra, (in Croatian) Element, Zagreb, 1995.5. Ž. Pauše: Exam Questions in Mathematics for Students of Engineering Studies, (in Croatian) Školska knjiga, Zagreb, 1995.6. Ž. Pauše: Mathematical Handbook 1, (in Croatian) Školska knjiga, Zagreb, 2003.7. Ž. Pauše: Mathematical Handbook 2, (in Croatian) Školska knjiga, Zagreb, 2004.				
Knowledge evaluation	Tests: 1. Integrals; 2. Linear Systems, Determinants, Matrices; 3. Differential Equations; 4. Numerical Methods. Za drugi potpis at least 40%, for passing written part of the exam at least 60% of pointsExaminations: consists of written and oral part. Each of them are eliminatory. Written part contains solving problems. Oral part contains discussion on the used method in solving problems.				
Prerequisites:	Students cannot enroll in this course unless they have completed Mathematics I Students cannot pass this course unless they have passed Mathematics I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18550/22366	ECTS	2	Type	
Name	Methodology and Management in Civil Engineering				
Status	5th semester - Compulsory courses - Management in Civil Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+46 (7+0+8+31+0)
Teachers	mr.sc. Slavko Belić dipl.soc, Nositelj predmeta, mr.sc. Slavko Belić dipl.soc, mr.sc. Slavko Belić dipl.soc,				
Course objectives	Students are taught to adopt objective based rational behaviour patterns so as to become more efficient both during their studies and later on in their professional work.				
Knowledge and competences	Students will obtain basic knowledge and skills needed for the organization, management and integration of employees into the working group, and for stimulating and motivating employees to be creative and innovative in their work. Communication, management, motivating, and team forming skills can be obtained based through adoption of appropriate work methods and techniques.				
Values:	-				
How lectures are held	Lectures will be conducted through demonstration and comparison of various management styles. In this way, students will learn that better business results may be achieved through an appropriate integration of experts and managers. An emphasis will be placed on the significance of using methods proper to social sciences to develop management as a profession and to develop managers - experts.				
How auditory exercises are held	Presentation of problems and tasks relating to managerial profession; solving problems both individually and in teams.				
How seminar exercises are held	Presentation of papers in areas of high interest to students.				
Course contents lectures	Definition of methodology and management, significance of methodology for the management (2). Intelligence and managerial work techniques (1). Entrepreneurship (1). The essence of management (1). Management styles (1). Education of good managers (1). Use of time and decision making (1). Fully professional communication (1). Integration of engineers into their working places (1). Pragmatism and ethics (1). Social values and management (1). Transformation, transmission and transfer of knowledge (2). Conflict solving capacity (1).				
Course contents auditory	Techniques indispensable for communication (1). Learning skill boosting techniques (2). T-group (2). Work role playing (2). Feed-back data (2). Group discussion as a technique for problem identification and solving (2).				
Course contents seminars	Writing papers and presenting one management-related book (as selected by the student).				
Course contents methodology	Making distinction between the whole and individual parts (2). Identification of problems and asking questions relating to field practice.				
Exam literature	Basic literature:1. Materials for lectures and exercises.2. Bobek, S., Hauc, A., Semolič, B., Treven, S.: Strategic Management and Projects, Informator, Zagreb, 1991.3. Drucker, P.F.: Innovations and entrepreneurship, Globus, Zagreb.Additional literature:1. At the beginning of the course, students are handed out a list of literature from which they have to select a book for presentation to a work group, or for preparation of a written report about the book.				
Knowledge evaluation	Oral examination may be taken only by students who have obtained at least 60% of points at the preliminary examination.				
Remark	Preparation of final paper is not possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Market and Business Environment Students cannot enroll in this course unless they have passed Sociology of Work Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18516/22365	ECTS	6	Type	
Name	Organization of Construction Site				
Status	5th semester - Compulsory courses - Management in Civil Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+150	(12+0+0+120+18)
Teachers	mr.sc. Petar Adamović prof.v.škole, Nositelj predmeta, prof.dr.sc. Zdravko Linarić dipl.ing.građ., Nositelj predmeta, prof.dr.sc. Zdravko Linarić dipl.ing.građ., prof.dr.sc. Zdravko Linarić dipl.ing.građ., Boris Uremović dipl.ing.građ., Boris Uremović dipl.ing.građ.,				
Course objectives	The aim of the course is to teach students how to organize the construction site in preparation for construction work.				
Knowledge and competences	Student will learn the site organization design with all calculations and drawings relating to the preparation of the site plan and organization of construction work.				
Values:	-				
How lectures are held	Appropriate teaching aids (video projector and computer) will be used during presentation of site organization techniques applied on real construction sites. Drawings, photographs, films and video recordings will also be used as appropriate.				
How construction exercises are held	Students will independently solve problems as needed for their assignment ("site organisation plan").				
Course contents lectures	Essential data for the elaboration of the site organisation plan (2). Site organisation plan (2). Organizational and managerial structure of a construction site (2). Technological approach to the realization of works (2). Determination of required capacities (labour, machines) (2). Construction site documentation (2). Occupational safety measures (2). Site plan (2). Site services and temporary roads (2). Organizing and planning site transport (internal and external) (2). Organization of production plants and construction machinery (2). Organization and supply of construction materials (2). Calculation of storage space (2). Defining and planning temporary on-site structures (2). Harmonizing work progress with project completion times (2).				
Course contents auditory	1. Site disposition and layout plan with all necessary calculations and drawings: On-site services and temporary roads (2). 2. Planning internal transport on the construction site (2). 3. Distribution of manufacturing plants and construction machinery (2). 4. Calculation of storage space, defining and planning temporary on-site structures (2). 5. Cost estimate for preliminary work (2). 6. Time schedule for the realization of preliminary works on a construction site (2).				
Course contents constructsures	Students independently prepare the assignment (site organisation plan for civil engineering and building engineering projects).				
Exam literature	Basic:1.J. Klepec: Organization of Construction Work - Preparatory Site Work, Sveučilište u Zagrebu, Građevinski fakultet, 1982.2.J. Marušić: Construction Management, Sveučilište u Zagrebu, 1994. Additional:1. G. Bučar: Technology and Organization of Construction Activities, Sarajevo, 1986.2. G. Bučar: Planning on Construction Projects, Osijek, 1993.				
Knowledge evaluation	Assignment (site organisation plan for civil engineering and building engineering projects), Presentation and explanation of Assignment. Written examination focusing on theory (lectures) and exercises (solving problems relating to the assignment - site organisation plan for civil engineering and building engineering projects) Oral examination (for students who passed the written examination)				
Remark	Preparation of final paper is possible				
Prerequisites:	Students cannot enroll in this course unless they have completed Market and Business Environment Students cannot enroll in this course unless they have completed Construction Machinery Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design Students cannot pass this course unless they have passed Construction Machinery				
Proposal made by	(26.09.2011)				



Code WEB/ISVU	18548/85288	ECTS	1	Type	
Name	Physical Education I				
Status	1st semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				0+30 (30+0+0+0+0)
Teachers	Natalija Špehar viši predavač, Nositelj predmeta,				
Course objectives	Meeting the basic bio-psycho-social human need for dynamic expression and movement; acquiring basic knowledge about the value of regular physical exercise during the entire lifetime; influence on anthropometrical properties (functional, motoric and cognitive capacities, conative properties and morphologic features); improving and preserving health and working capacity.				
Knowledge and competences	During this four-semester course focusing on improvement of health and physical capacity of students, an emphasis will be placed on improvement of already existing knowledge and skills relating to a particular activity (sport) and, at the same time, new knowledge and skills will be acquired in fields not as yet practiced by students. The level of motorical and functional capacities will be increased, morphological properties will positively be modified (subcutaneous fatty tissue will be reduced, muscles will be formed and strengthened) and hence general health of students will be preserved and additionally improved. Through lectures, students will learn about the value of regular and proper physical activity and exercises in all stages of our life, as well as about the value of an appropriate diet, and will learn about the history of sports in general terms. In addition, students will be given information about contraception and prevention of venereal diseases, about prevention and suppression of all kinds of addiction, and will acquire knowledge in the area of physical culture, health and sports, that is highly significant in everyday life, and should be regarded as a part of basic civil behaviour of every individual.				
Values:	-				
How lectures are held	Lectures are auditory and are accompanied with drawings and other illustrations aimed at facilitating comprehension. During lectures, attempts are made to encourage discussion in order to make students think about topics presented and to make appropriate conclusions. Some of the themes normally raised during discussions are issues relating to exercises, diet, injuries, etc.				
How laboratory exercises are held	Exercises (practical and auditory) are conducted in the gym, on the swimming pool or in open spaces, as indicated in the program. Students are free to select 1-3 activities in accordance with their wishes, capacities and inclinations - athletics, swimming, water polo, basketball, volleyball, handball, five-a-side football, badminton, basic kinesiological transformations (aerobics, fitness), ice skating, roller skating, hiking mountaineering. A kinesiotherapy program adjusted to students with special needs will be organised for students with health impairment.				
Course contents lectures	Kinesiology. Education, sport, recreation, and kinesiotherapy. Anthropometric properties of man (morphological and anatomic/functional properties of man). Motoric and functional capabilities. Fundamentals of nutrition. Nutrition and physical activity. History of sports. Sport and University games. Influence of regular physical activity on human organism. Load dimensioning. Recreation. Kinesiotherapy and athletic activity of handicapped persons. Injuries, first aid and rehabilitation. Student forums organized in consultation with the Public Health Institute: Contraception. Venereal diseases. Addictions. Successful learning, etc.				
Course contents laboratory	Practicing basic elements of individual activities, improving existing skills and acquiring new knowledge; rules and games; technical-tactical elements of individual activities, influence of each activity on the person's bio-psycho-social status, game, organization of tournaments and competitions.				
Exam literature	Basic: There is no obligatory literature as no examination is anticipated for this course. Students are however encouraged to read literature relating to the physical culture and health, improvement and preservation of health, good dieting practices, prevention of injuries, history of sports, sporting rules, training methods and objectives, importance of regular exercises throughout the lifetime, news from the world of sports, recreation and kinesiotherapy. Additional: Anderson, B., E. Burke, B. Pearl (1997.). Fitness za sve, Zagreb: Gopal. Anderson, B. (2001.). Stretching. Zagreb: Gopal. Clark, N. (2000). Sportska prehrana. Zagreb: Gopal. Čorak, N. (2001.). Fitness Bodybuilding, Zagreb: Hinus. Ellis J., J. Henderson (1997.). Trčanje bez ozljeda, Zagreb: Gopal. Guyton, A. C. (1995). Fiziologija čovjeka i mehanizmi bolesti. Zagreb: Medicinska naklada Kosinac, Z., (2002). Kineziterapija sustava za kretanje, Split: Sveučilište u Splitu. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2000). Spolno prenosive bolesti, Reproaktivno zdravlje, Metode i sredstva za zaštitu od trudnoće, Zagreb. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2001). Kontracepcija 00 vodič kroz metode i sredstva za sprječavanje trudnoće, Zagreb. Kulier, I (2003). Strategija mršavljenja, Zagreb: Impress. Kulier, I. (2001). Što jedemo, Zagreb: Impress. Mali anatomski atlas (1970). NAŠE TIJELO, Zagreb: Školska knjiga. Medved, R. i suradnici (1987). Sportska medicina. Zagreb: Jumeša. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: Fakultet za fizičku kulturu. Milanović, D. i suradnici (1997). Priručnik za sportske trenere. Zagreb: Fakultet za fizičku kulturu. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: Fakultet za fizičku kulturu. Announcements and information available at the web site: http://free-zg.htnet.hr/fit/				
Knowledge evaluation	Students are required to actively participate in exercises during 30 hours per semester, during four semester. First semester students must go through the swimming test (non-swimmers have to attend the swimming school during the second semester). Second semester students must be present both at lectures and at exercises. Students not required to attend because of active participation in sports are however required to attend all lectures, assist in organization and implementation of lectures and attend a specially devised program if permitted to do so by the sports doctor.				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18579/85289	ECTS	1	Type	
Name	Physical Education II				
Status	2nd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+32 (30+0+0+2+0)
Teachers	Natalija Špehar viši predavač, Nositelj predmeta, Natalija Špehar viši predavač,				
Course objectives	Meeting the basic bio-psycho-social human need for dynamic expression and movement; acquiring basic knowledge about the value of regular physical exercise during the entire lifetime; influence on anthropometrical properties (functional, motoric and cognitive capacities, conative properties and morphologic features); improving and preserving health and working capacity.				
Knowledge and competences	During this four-semester course focusing on improvement of health and physical capacity of students, an emphasis will be placed on improvement of already existing knowledge and skills relating to a particular activity (sport) and, at the same time, new knowledge and skills will be acquired in fields not as yet practiced by students. The level of motorical and functional capacities will be increased, morphological properties will positively be modified (subcutaneous fatty tissue will be reduced, muscles will be formed and strengthened) and hence general health of students will be preserved and additionally improved. Through lectures, students will learn about the value of regular and proper physical activity and exercises in all stages of our life, as well as about the value of an appropriate diet, and will learn about the history of sports in general terms. In addition, students will be given information about contraception and prevention of venereal diseases, about prevention and suppression of all kinds of addiction, and will acquire knowledge in the area of physical culture, health and sports, that is highly significant in everyday life, and should be regarded as a part of basic civil behaviour of every individual.				
Values:	-				
How lectures are held	Lectures are auditory and are accompanied with drawings and other illustrations aimed at facilitating comprehension. During lectures, attempts are made to encourage discussion in order to make students think about topics presented and to make appropriate conclusions. Some of the themes normally raised during discussions are issues relating to exercises, diet, injuries, etc.				
How laboratory exercises are held	Exercises (practical and auditory) are conducted in the gym, on the swimming pool or in open spaces, as indicated in the program. Students are free to select 1-3 activities in accordance with their wishes, capacities and inclinations - athletics, swimming, water polo, basketball, volleyball, handball, five-a-side football, badminton, basic kinesiological transformations (aerobics, fitness), ice skating, roller skating, hiking mountaineering. A kinesiotherapy program adjusted to students with special needs will be organised for students with health impairment.				
Course contents lectures	Kinesiology. Education, sport, recreation, and kinesiotherapy. Anthropometric properties of man (morphological and anatomic/functional properties of man). Motoric and functional capabilities. Fundamentals of nutrition. Nutrition and physical activity. History of sports. Sport and University games. Influence of regular physical activity on human organism. Load dimensioning. Recreation. Kinesiotherapy and athletic activity of handicapped persons. Injuries, first aid and rehabilitation. Student forums organized in consultation with the Public Health Institute: Contraception. Venereal diseases. Addictions. Successful learning, etc.				
Course contents laboratory	Auditory and practical: Practicing basic elements of individual activities, improving existing skills and acquiring new knowledge; rules and games; technical-tactical elements of individual activities, influence of each activity on the person's bio-psycho-social status, game, organization of tournaments and competitions.				
Exam literature	Basic: There is no obligatory literature as no examination is anticipated for this course. Students are however encouraged to read literature relating to the physical culture and health, improvement and preservation of health, good dieting practices, prevention of injuries, history of sports, sporting rules, training methods and objectives, importance of regular exercises throughout the lifetime, news from the world of sports, recreation and kinesiotherapy. Additional: Anderson, B., E. Burke, B. Pearl (1997.). Fitness za sve, Zagreb: Gopal. Anderson, B. (2001.). Stretching. Zagreb: Gopal. Clark, N. (2000). Sportska prehrana. Zagreb: Gopal. Ćorak, N. (2001.). Fitness Bodybuilding, Zagreb: Hinus. Ellis J., J. Henderson (1997.). Trčanje bez ozljeda, Zagreb: Gopal. Guyton, A. C. (1995). Fiziologija čovjeka i mehanizmi bolesti. Zagreb: Medicinska naklada Kosinac, Z., (2002). Kineziterapija sustava za kretanje, Split: Sveučilište u Splitu. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2000). Spolno prenosive bolesti, Reproaktivno zdravlje, Metode i sredstva za zaštitu od trudnoće, Zagreb. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2001). Kontracepcija 00 vodič kroz metode i sredstva za sprječavanje trudnoće, Zagreb. Kulier, I (2003). Strategija mršavljenja, Zagreb: Impress. Kulier, I. (2001). Što jedemo, Zagreb: Impress. Mali anatomski atlas (1970). NAŠE TIJELO, Zagreb: Školska knjiga. Medved, R. i suradnici (1987). Sportska medicina. Zagreb: Jumea. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: Fakultet za fizičku kulturu. Milanović, D. i suradnici (1997). Priručnik za sportske trenere. Zagreb: Fakultet za fizičku kulturu. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: Fakultet za fizičku kulturu. Announcements and information available at the web site: http://free-zg.htnet.hr/fit/				
Knowledge evaluation	Students are required to actively participate in exercises during 30 hours per semester, during four semester. First semester students must go through the swimming test (non-swimmers have to attend the swimming school during the second semester). Second semester students must be present both at lectures and at exercises. Students not required to attend because of active participation in sports are however required to attend all lectures, assist in organization and implementation of lectures and attend a specially devised program if permitted to do so by the sports doctor.				
Prerequisites:	Students cannot enroll in this course unless they have enrolled Physical Education I Students cannot enroll in this course unless they have completed Physical Education I				
Proposal made by	()				



Code WEB/ISVU	18580/85290	ECTS	1	Type	
Name	Physical Education III				
Status	3rd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				0+30 (30+0+0+0+0)
Teachers	Natalija Špehar viši predavač, Nositelj predmeta,				
Course objectives	Meeting the basic bio-psycho-social human need for dynamic expression and movement; acquiring basic knowledge about the value of regular physical exercise during the entire lifetime; influence on anthropometrical properties (functional, motoric and cognitive capacities, conative properties and morphologic features); improving and preserving health and working capacity.				
Knowledge and competences	During this four-semester course focusing on improvement of health and physical capacity of students, an emphasis will be placed on improvement of already existing knowledge and skills relating to a particular activity (sport) and, at the same time, new knowledge and skills will be acquired in fields not as yet practiced by students. The level of motorical and functional capacities will be increased, morphological properties will positively be modified (subcutaneous fatty tissue will be reduced, muscles will be formed and strengthened) and hence general health of students will be preserved and additionally improved. Through lectures, students will learn about the value of regular and proper physical activity and exercises in all stages of our life, as well as about the value of an appropriate diet, and will learn about the history of sports in general terms. In addition, students will be given information about contraception and prevention of venereal diseases, about prevention and suppression of all kinds of addiction, and will acquire knowledge in the area of physical culture, health and sports, that is highly significant in everyday life, and should be regarded as a part of basic civil behaviour of every individual.				
Values:	-				
How lectures are held	Lectures are auditory and are accompanied with drawings and other illustrations aimed at facilitating comprehension. During lectures, attempts are made to encourage discussion in order to make students think about topics presented and to make appropriate conclusions. Some of the themes normally raised during discussions are issues relating to exercises, diet, injuries, etc.				
How laboratory exercises are held	Exercises (practical and auditory) are conducted in the gym, on the swimming pool or in open spaces, as indicated in the program. Students are free to select 1-3 activities in accordance with their wishes, capacities and inclinations - athletics, swimming, water polo, basketball, volleyball, handball, five-a-side football, badminton, basic kinesiological transformations (aerobics, fitness), ice skating, roller skating, hiking mountaineering. A kinesiotherapy program adjusted to students with special needs will be organised for students with health impairment.				
Course contents lectures	Kinesiology. Education, sport, recreation, and kinesiotherapy. Anthropometric properties of man (morphological and anatomic/functional properties of man). Motoric and functional capabilities. Fundamentals of nutrition. Nutrition and physical activity. History of sports. Sport and University games. Influence of regular physical activity on human organism. Load dimensioning. Recreation. Kinesiotherapy and athletic activity of handicapped persons. Injuries, first aid and rehabilitation. Student forums organized in consultation with the Public Health Institute: Contraception. Venereal diseases. Addictions. Successful learning, etc.				
Course contents laboratory	Auditory and practical: Practicing basic elements of individual activities, improving existing skills and acquiring new knowledge; rules and games; technical-tactical elements of individual activities, influence of each activity on the person's bio-psycho-social status, game, organization of tournaments and competitions.				
Exam literature	Basic: There is no obligatory literature as no examination is anticipated for this course. Students are however encouraged to read literature relating to the physical culture and health, improvement and preservation of health, good dieting practices, prevention of injuries, history of sports, sporting rules, training methods and objectives, importance of regular exercises throughout the lifetime, news from the world of sports, recreation and kinesiotherapy. Additional: Anderson, B., E. Burke, B. Pearl (1997.). Fitness za sve, Zagreb: Gopal. Anderson, B. (2001.). Stretching. Zagreb: Gopal. Clark, N. (2000). Sportska prehrana. Zagreb: Gopal. Čorak, N. (2001.). Fitness Bodybuilding, Zagreb: Hinus. Ellis J., J. Henderson (1997.). Trčanje bez ozljeda, Zagreb: Gopal. Guyton, A. C. (1995). Fiziologija čovjeka i mehanizmi bolesti. Zagreb: Medicinska naklada Kosinac, Z., (2002). Kineziterapija sustava za kretanje, Split: Sveučilište u Splitu. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2000). Spolno prenosive bolesti, Reproaktivno zdravlje, Metode i sredstva za zaštitu od trudnoće, Zagreb. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2001). Kontracepcija 00 vodič kroz metode i sredstva za sprječavanje trudnoće, Zagreb. Kulier, I. (2003). Strategija mršavljenja, Zagreb: Impress. Kulier, I. (2001). Što jedemo, Zagreb: Impress. Mali anatomski atlas (1970). NAŠE TIJELO, Zagreb: Školska knjiga. Medved, R. i suradnici (1987). Sportska medicina. Zagreb: Jumeša. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: Fakultet za fizičku kulturu. Milanović, D. i suradnici (1997). Priručnik za sportske trenere. Zagreb: Fakultet za fizičku kulturu. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: Fakultet za fizičku kulturu. Announcements and information available at the web site: http://free-zg.htnet.hr/fit/				
Knowledge evaluation	Students are required to actively participate in exercises during 30 hours per semester, during four semester. First semester students must go through the swimming test (non-swimmers have to attend the swimming school during the second semester). Second semester students must be present both at lectures and at exercises. Students not required to attend because of active participation in sports are however required to attend all lectures, assist in organization and implementation of lectures and attend a specially devised program if permitted to do so by the sports doctor.				
Prerequisites:	Students cannot enroll in this course unless they have completed Physical Education I Students cannot enroll in this course unless they have completed Physical Education II				
Proposal made by	()				



Code WEB/ISVU	18581/85292	ECTS	1	Type	
Name	Physical Education IV				
Status	4th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				0+31 (30+0+0+1+0)
Teachers	Natalija Špehar viši predavač, Nositelj predmeta,				
Course objectives	Meeting the basic bio-psycho-social human need for dynamic expression and movement; acquiring basic knowledge about the value of regular physical exercise during the entire lifetime; influence on anthropometrical properties (functional, motoric and cognitive capacities, conative properties and morphologic features); improving and preserving health and working capacity.				
Knowledge and competences	During this four-semester course focusing on improvement of health and physical capacity of students, an emphasis will be placed on improvement of already existing knowledge and skills relating to a particular activity (sport) and, at the same time, new knowledge and skills will be acquired in fields not as yet practiced by students. The level of motorical and functional capacities will be increased, morphological properties will positively be modified (subcutaneous fatty tissue will be reduced, muscles will be formed and strengthened) and hence general health of students will be preserved and additionally improved. Through lectures, students will learn about the value of regular and proper physical activity and exercises in all stages of our life, as well as about the value of an appropriate diet, and will learn about the history of sports in general terms. In addition, students will be given information about contraception and prevention of venereal diseases, about prevention and suppression of all kinds of addiction, and will acquire knowledge in the area of physical culture, health and sports, that is highly significant in everyday life, and should be regarded as a part of basic civil behaviour of every individual.				
Values:	-				
How lectures are held	Lectures are auditory and are accompanied with drawings and other illustrations aimed at facilitating comprehension. During lectures, attempts are made to encourage discussion in order to make students think about topics presented and to make appropriate conclusions. Some of the themes normally raised during discussions are issues relating to exercises, diet, injuries, etc.				
How laboratory exercises are held	Exercises (practical and auditory) are conducted in the gym, on the swimming pool or in open spaces, as indicated in the program. Students are free to select 1-3 activities in accordance with their wishes, capacities and inclinations - athletics, swimming, water polo, basketball, volleyball, handball, five-a-side football, badminton, basic kinesiological transformations (aerobics, fitness), ice skating, roller skating, hiking mountaineering. A kinesiotherapy program adjusted to students with special needs will be organised for students with health impairment.				
Exam literature	Basic: There is no obligatory literature as no examination is anticipated for this course. Students are however encouraged to read literature relating to the physical culture and health, improvement and preservation of health, good dieting practices, prevention of injuries, history of sports, sporting rules, training methods and objectives, importance of regular exercises throughout the lifetime, news from the world of sports, recreation and kinesiotherapy. Additional: Anderson, B., E. Burke, B. Pearl (1997.). Fitness za sve, Zagreb: Gopal. Anderson, B. (2001.). Stretching. Zagreb: Gopal. Clark, N. (2000). Sportska prehrana. Zagreb: Gopal. Ćorak, N. (2001.). Fitness Bodybuilding, Zagreb: Hinus. Ellis J., J. Henderson (1997.). Trčanje bez ozljeda, Zagreb: Gopal. Guyton, A. C. (1995). Fiziologija čovjeka i mehanizmi bolesti. Zagreb: Medicinska naklada Kosinac, Z., (2002). Kineziterapija sustava za kretanje, Split: Sveučilište u Splitu. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2000). Spolno prenosive bolesti, Reproaktivno zdravlje, Metode i sredstva za zaštitu od trudnoće, Zagreb. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2001). Kontracepcija 00 vodič kroz metode i sredstva za sprječavanje trudnoće, Zagreb. Kulier, I (2003). Strategija mršavljenja, Zagreb: Impress. Kulier, I. (2001). Što jedemo, Zagreb: Impress. Mali anatomski atlas (1970). NAŠE TIJELO, Zagreb: Školska knjiga. Medved, R. i suradnici (1987). Sportska medicina. Zagreb: Jumea. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: Fakultet za fizičku kulturu. Milanović, D. i suradnici (1997). Priručnik za sportske trenere. Zagreb: Fakultet za fizičku kulturu. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: Fakultet za fizičku kulturu. Announcements and information available at the web site: http://free-zg.htnet.hr/fit/				
Knowledge evaluation	Students are required to actively participate in exercises during 30 hours per semester, during four semester. First semester students must go through the swimming test (non-swimmers have to attend the swimming school during the second semester). Second semester students must be present both at lectures and at exercises. Students not required to attend because of active participation in sports are however required to attend all lectures, assist in organization and implementation of lectures and attend a specially devised program if permitted to do so by the sports doctor.				
Prerequisites:	Students cannot enroll in this course unless they have completed Physical Education II Students cannot enroll in this course unless they have completed Physical Education III				
Proposal made by	()				



Code WEB/ISVU	18527/22336	ECTS	5	Type	
Name	Physics				
Status	2nd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (15+15+0+90+0)	
Teachers	prof.vis.šk. Ivica Levanat , Nositelj predmeta, Lahorija Bistričić , Dubravko Horvat , Alemka Knapp , Mario Matijević , Miro Prpić ,				
Course objectives	To understand physical phenomena and quantities which will be useful in the study of civil engineering, described within a broader context of the basic laws of physics.				
Knowledge and competences	Elementary knowledge of relevant physical quantities and their relationships. Simple problem solving; measurements and description of the results.				
Values:	-				
How lectures are held	Oral presentation, including communication with students; their active participation is stimulated during formulation and analysis of physical laws. Physical phenomena and laws are illustrated by familiar examples or improvised demonstrations, and by simple experiments where possible. Equations and their derivations are fully outlined on the blackboard, illustrated by sketches and diagrams as appropriate.				
How auditory exercises are held	Solving simpler problems in the topics covered by the lectures, in order to increase understanding of physical quantities and their interrelations. Calculations include numerical values which appear in technical applications. Teacher explains and illustrates the procedure, students solve the problems on the blackboard and in their notebooks.				
How laboratory exercises are held	Measurement of physical quantities which illustrate physical laws introduced in the lectures. Analysis of the measurements results.				
Course contents lectures	Physical quantities and units (2). Rectilinear motion (2). Circular motion, rotation (2). Newton's axioms, momentum; forces (2). Work, power and energy (2). Einstein's relativity, energy and matter (2). Law of gravity, field, potential (2). Electric force and voltage, current (2). Magnetic field, electromagnetic induction (4). Hydrostatics (pressure, buoyancy, surface tension) (2). Hydrodynamics (ideal fluid, Bernoulli equation) (2). Harmonic oscillations, waves (2). Heat and temperature, heat transfer (2). Ideal gas, laws of thermodynamics (2).				
Course contents auditory	Topics in principle follow the lectures: Motion along straight line and circle (3). Newton's axioms, work and energy (3). Gravitational and electric field (1). DC circuits, alternating current (3). Hydrostatics and hydrodynamics (2). Harmonic oscillations (1). Heat and temperature (2).				
Course contents constructs	Measurements and analysis of results (3). Density of solids (2). Density of alcohol (2). Law of the spiral spring (2). Torsion pendulum (2). Joules law (2). Alternating current power (2).				
Exam literature	Basic literature:1. Kulišić, P., Mehanika i toplina, Školska knjiga, Zagreb, 1989.2. Kuzmanović, B., Osnove elektrotehnike 1, Element, Zagreb, 2001. Additional literature:1. Young Freedman, University Physics, Addison Wesley, San Francisco, 2004.				
Knowledge evaluation	Preparation for lab exercises and reports on measurements Written and oral exam				
Prerequisites:	Students cannot pass this course unless they have completed Mathematics I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18549/22364	ECTS	5	Type	
Name	Planning Methods				
Status	6th semester - Compulsory courses - Management in Civil Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (9+0+0+90+21)	
Teachers	mr.sc. Časlav Dunović , viši predavač, Nositelj predmeta, Boris Uremović dipl.ing.građ., Boris Uremović dipl.ing.građ.,				
Course objectives	The aim of the course is to teach students the planning techniques and time scheduling for construction work, including all necessary resources.				
Knowledge and competences	Student will learn the methodology and planning methods, the planning techniques based on technology selected for the realization of work, will get essential knowledge on time-related financial monitoring of projects, construction plan updating, and use of computers in the planning process (MS Project).				
Values:	-				
How lectures are held	Appropriate teaching aids (video projectors and computers) will be used during lectures.				
How auditory exercises are held	Exercises will be conducted in the computer room where topics relating to program preparation (operative construction plan) are explained based on the MS Project software.				
How construction exercises are held	These exercises will be conducted in the computer room where students will independently solve practical planning problems on-real life examples, all based on the PS Project software.				
Course contents lectures	(1) Role of planning in construction process (2) Approaches and concepts (2). Plan and planning requirements (2). Plans - classification and types (2). Objectives, principles and methodology for elaboration of plans (2). Input parameters and values relevant for the elaboration of plans (2). Time scheduling technique using methods CPM, Pert and PDM, and the scope of application (4). Work phases and definition of plan elaboration activities (2). Optimization and control of realization (2). Use of computer programs in planning (2). Basic principles of planning with the MS Project software package (4). Management of resources (costs, labour, machines) (4).				
Course contents auditory	1. Introduction to MS Project and overview of basic commands (1). 2. Using MS Project to create a plan (Gantt chart), entering activities, entering data for appropriate activities, duration of activities (2). 3. Grouping activities, type of connections, establishing and changing connections among activities, time reserves, identification of critical path, Gantt chart changing, preparation for printing (2). 4. Creating a time schedule, entering activities, allocation of data to appropriate activities, establishing and changing connections among activities, modification of time schedule, preparation for printing (2). 5. Definition and allocation of resources, entering resource data in the plan, definition and allocation of costs, entering cost data in the plan, graphical presentation of resources and costs, preparation for printing (1). 6. Plan analysis and harmonization, plan harmonization and plan shortening strategies, solving problems related to the excessive use of resources (1).				
Course contents constructs	Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package.				
Exam literature	Basic literature:1. S. Nonveiller: Time Scheduling Methods and Their Use in Construction Management, GF Zagreb, Zagreb, 1982.2. J. Branderberg, R. Konrad: Time Scheduling Technique, Tehnička knjiga, Zagreb, 1970. Additional literature:1. J. Marušić: Construction Management, Sveučilište u Zagrebu, 1994.2. MS Project: User's guide.				
Knowledge evaluation	1 assignment (operative plan for a construction project), Explanations relating to the above assignment Oral examination (students may take this exam after having fulfilled the above obligations)				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Construction Management I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18572/22387	ECTS	5	Type	
Name	Prefabricated Structures				
Status	5th semester - Compulsory courses - Building Construction				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (15+0+5+90+10)	
Teachers	prof.vis.šk. Boris Baljkas , Nositelj predmeta, prof.vis.šk. Boris Baljkas , prof.vis.šk. Boris Baljkas , prof.vis.šk. Boris Baljkas ,				
Course objectives	Acquirement of basic knowledge about prefabricated systems and related technologies.				
Knowledge and competences	After completion of the course, students will be qualified to participate in the design and realization of prefabricated structures.				
Values:	-				
How lectures are held	Real life diagrams relating to the design, fabrication and assembly work, are presented through drawings, photographs and video recordings.				
How auditory exercises are held	Presentation of structures via drawings, with explanations.				
How seminar exercises are held	Students are required to prepare a seminar paper for a selected building, including photographs and drawings.				
How construction exercises are held	Preparation of structural drawings with typical details.				
Course contents lectures	Introduction (2). Industrial construction techniques: advantages and shortcomings (2). Prefabricated reinforced concrete structures: Large area systems, skeleton systems, spatial systems, and mixed systems (5). Systems made of lightweight concrete and brick (2). Typical prefabricated structures made of steel, wood and artificial materials (5). Roofs and facade systems (2). Glass/steel composite systems (1). Membrane structures: textile - steel (1). Residential houses based on wood and steel (3). Assembly of structures: sequence, mechanical plant, scaffolds (3). Presentation of completed structures made of concrete, steel, and wood (4).				
Course contents auditory	Presentation of typical systems according to the concept and type of materials (2). Preparations for seminar paper (1). Selection of structure for seminar paper (team work: 5 student teams) (2). Joint vision of three construction sites - field practice (10).				
Course contents seminars	Elaboration of seminar paper relating to a specified structure, including descriptions, drawings and photographs. Presentation of seminar work to the entire class followed by discussion (10)				
Course contents constructsures	Establishment of a layout plan for a structure (2). Elaboration of typical details (3).				
Exam literature	Basic literature:1. S. Rex: Industrial Construction Methods, Grad. fak. u Zagrebu, 1981.2. S. Rex: Industrial Construction Methods II - Prefabricated Construction, Grad. fak u Zagrebu, 1983.Additional literature:1. H.C. Schulitz, W. Sobek, K.J. Habermann: Steel Construction Manual, Birkhauser Verlag, Basel, 1999.2. F. Kind-Barkauskas, B. Kauhsen, S. Polonyi, J. Brandt: Concrete Construction Manual, Birkhauser E. 2002.3. J. Natterer, W. Winter, T. Herzog, S and M. Volz: Timber Construction Manual, Birkhauser E., 2003.4. C. Schittlich, G. Staib, D. Balkow, M. Schuler, W. Sobek: Glass Construction Manual, Birkhauser Edition Detail, 1998.5. T. Herzog, R. Krippner, W. Lang: Facade Construction Manual, Birkhauser Edition Detail, 2004.6. G. Pfeifer, R. Racke, J. Achtiger, K. Zilch: Masonry Construction Manual, Birkhauser Edition Detail, 2001.7. Klaus-Michael Koch: Bauen Mit Membranen, Prestel Verlag, 2004, ISBN: 3-7913-3048-9.				
Knowledge evaluation	Written part of the examination consists of five questions.Oral part of the examination may be taken by students that obtained at least 60 percent of points during the written examination. Lecturer will discuss with student the answers provided during the written part of the examination and will ask him/her questions as appropriate.				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Concrete Structures II Students cannot enroll in this course unless they have passed Wooden Structures Students cannot enroll in this course unless they have passed Concrete Structures I Students cannot enroll in this course unless they have completed Steel Structures Students cannot enroll in this course unless they have passed Mathematics II				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18553/22369	ECTS	5	Type	
Name	Project Management and Legislation				
Status	5th semester - Compulsory courses - Management in Civil Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+121	(15+0+0+106+0)
Teachers	mr.sc. Petar Adamović prof.v.škole, Nositelj predmeta, mr.sc. Petar Adamović prof.v.škole, mr.sc. Petar Adamović prof.v.škole,				
Course objectives	The aim of the course is to teach students to perform all activities needed for the management of construction projects, from the idea to the completion of the project, all in accordance with prevailing regulations.				
Knowledge and competences	Knowledge of regulations applicable to construction industry - documents and documentation, subjects and participants, and relationships among subject taking part in the construction process.				
Values:	-				
How lectures are held	Appropriate teaching aids (video projector and computer) are used as needed during the lectures.				
How auditory exercises are held	Administrative documents and documentation relating to completed structures/projects are presented, explained and commented on.				
How seminar exercises are held	The final result of auditory exercises is the seminar paper.				
Course contents lectures	Introduction, terms, definitions (2). Construction regulations, regulations aimed at protecting public interest (2). Participants in projects (2). Systemic approach, construction as a project (2). Activities for the delivery of the location permit (2). Location permit, investment study, decision (2). Technical documentation, building permit (2). Procurement and award of works (2). Construction site documents (2). Financial documents and payment of work (2). Technical supervision, inspections (2). Final account (2). Final inspection and operating permit (2). Safety at work, safety measures (2). Quality assurance (2).				
Course contents auditory	Topics and elements relating to the field of project management are explained on concrete examples from the aspect of administrative documents and documentation: preliminary investigations, investment documents, location permit, site documents, building permit, as-built documents, operating permit.				
Course contents seminars	Each student independently prepares a seminar paper based on one of the topics covered during auditory exercises.				
Exam literature	Basic:1. Building Law2. Skendrović, V.: Project Management, Informator, Zagreb, 1986.Additional:I. Simić-Bosanac: Construction Industry Regulations, Centar za informacije i publicitet, Zagreb, 1978.				
Knowledge evaluation	- presentation of seminar paper- oral examination (only for students who successfully presented the seminar paper)				
Remark	Presentation of final paper is not possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Market and Business Environment Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18540/22355	ECTS	5	Type	
Name	Public Roads I				
Status	4th semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (10+0+0+90+20)	
Teachers	dr.sc. Damir Pološki dipl.ing.građ., Nositelj predmeta, Luka Kosmat dipl.ing.građ., Stjepan Landek dipl.ing.građ.				
Course objectives	Acquirement of basic theoretical and practical knowledge about the design, construction and maintenance of roads, intersections and other road infrastructure.				
Knowledge and competences	During this course, students will gain knowledge and skills needed for the preparation of studies and design documents (within a multidisciplinary team) for work during construction and maintenance of roads.				
Values:	-				
How lectures are held	Lectures will be conducted as oral presentation of the course, and will be illustrated with practical examples and modern planning methods as shown via an overhead projector.				
How construction exercises are held	Each student will prepare an assignment (a shortened version of preliminary design for a road).				
Course contents lectures	Historic development of road construction (2). Classification of roads, legislation and regulations (2). Reference vehicles, theory of movement and transport (2). Reference velocities (2). Road features (2). Plan elements of the route (4). Vertical elements of the route (2). Cross section of the road (2). Road alignment andshaping (2). Road intersections (2). Split-level road intersections and combined intersections (2). Road furniture (2). Road construction and maintenance (2). Studies and design documents (2).				
Course contents constructs	20 hours - Shortened version of a preliminary design for a road. Zero polygon and determination of tangents (2). Road plan on the scale of 1/2000 (6). Plan view of a connection - T intersection on the scale of 1/500 (2). Longitudinal profile of a road - scale 1/2000/200 (6). Standard cross section, scale 1/50 (2). Technical description (2).				
Exam literature	Basic literature:1. Božičević, J., Legac, I.: Road infrastructure, Fakultet prometnih znanosti, Zagreb, 2001. Additional literature:1. Byelaw on basic traffic safety requirements relating to rural public roads and their elements, Official Gazette No. 110/01, Zagreb 2001.2. Highway Capacity Manual (HCM), Spec. Rpt, 4th Edition, Washington DC, 2000.3. Weise, G.; Durth, W.u.a: Strassenbau - Planung und Entwurf, Verlag fr Bauwesen, Berlin, 1997 (selected chapters).				
Knowledge evaluation	Assignment: Preliminary design for a road (shortened version)Written part of the examination consists of 5 questions relating to matters presented during the course and exercises.Oral part of the examination may be taken by candidates who obtained at least 60 percent of points at the written part of the examination.				
Prerequisites:	Students cannot enroll in this course unless they have passed Descriptive Geometry in Civil Engineering II Students cannot enroll in this course unless they have completed Geodesy Students cannot pass this course unless they have passed Geodesy				
Proposal made by	(25.10.2006)				



Code WEB/ISVU	18556/22371	ECTS	5	Type	
Name	Public Roads II				
Status	5th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure)				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120	(10+0+0+90+20)
Teachers	dr.sc. Damir Pološki dipl.ing.građ., Nositelj predmeta, Luka Kosmat dipl.ing.građ., Luka Kosmat dipl.ing.građ., Stjepan Landek dipl.ing.građ., Stjepan Landek dipl.ing.građ.				
Course objectives	Acquirement of theoretical and practical knowledge to independently solve problems relating to road bed (preparation, construction, stability, protection and repair of road bed)				
Knowledge and competences	After completion of this course, students will acquire knowledge and skills for the preparation, construction and maintenance of roads and all structures along the road bed (either independently or as a member of a multidisciplinary team).				
Values:	-				
How lectures are held	Lectures will be conducted as oral presentations which will be illustrated with real on-site examples. At that, an emphasis will be placed on evaluation of such examples. Appropriate teaching aids (overhead projector, video projector) will be used to facilitate understanding of topics presented during the course.				
How construction exercises are held	Students will independently prepare a preliminary design for a road.				
Course contents lectures	Preparations for construction work, organization of construction site (2). Technical classification of soil, properties of soil (2). Road bed and pavement structure (4). Soil excavation procedures (2). Embankment construction, soil disposal (2). Improvement of soil characterized by poor bearing capacity (2). Transport of materials (2). Soil stabilization structures (2). Subgrade preparation (2). Elements of pavement structure (1). Types of pavement structures (2). Road drainage (2). Calculation of completed work (2). Environmental protection facilities (2).				
Course contents constructs	Elaboration of a typical cross section with appropriate structures (12). Calculation, arrangement and balancing of earthworks (mass haul diagram) (4). Calculation of works and technical description (4).				
Exam literature	Basic literature:1. Božičević J., Legac I., Road infrastructure, Fakultet prometnih znanosti, Zagreb, 2001.2. General Technical Requirements for Road Works, Volumes I, II, Hrvatske ceste and Hrvatske autoceste, Zagreb, 2001.Additional literature:1. Wiehler, H-G u.a: Strassenbau - Konstruktion und Ausfhrung, Verlag fr Bauwesen, Berlin, 1996.2. Technical requirements for industrial roads, Znanstveni savjet za promet JAZU, 1989, Zagreb.				
Knowledge evaluation	Preparation of an assignment.Written part of the examination consists of 5 questions relating to topics covered during lectures and exercises.Oral part of the examination (may be taken only by students who acquired at least 60 points during the written part of the examination)				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Public Roads I Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design Students cannot pass this course unless they have passed Public Roads I				
Proposal made by	(25.10.2006)				



Code WEB/ISVU	18555/22370	ECTS	6	Type	
Name	Railways				
Status	6th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure)				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+150	(5+0+0+105+40)
Teachers	mr.sc. Ante Goran Bajić viši predavač, Nositelj predmeta, mr.sc. Ante Goran Bajić viši predavač, mr.sc. Ante Goran Bajić viši predavač,				
Course objectives	Students will acquire theoretical, practical and operative knowledge about the construction and maintenance of railways and railway systems, and will visit major railway construction sites and plants.				
Knowledge and competences	After completion of the course, students will be able to participate in the construction and maintenance of railways and railway plants.				
Values:	-				
How lectures are held	Theoretical lectures during which appropriate teaching aids are used (slide projector, overhead projector and video recorder), and visit of major railway construction sites and plants.				
How auditory exercises are held	Instructions, numerical examples, and regulations.				
How construction exercises are held	students independently solve problems for the assignment.				
Course contents lectures	5th Semester (2+1)Introduction and general properties of railways. Transport. Transportation facilities (classification). Historic development of railways. Classification of railways. Loading gauge. Railway clearance. Wheel trim geometry. Rentability of railways (4).Type of traction. Principal characteristics (advantages and shortcomings), steam locomotive, electric locomotive, and diesel locomotive (2).Railway elements: (classification of railways, track width, number of tracks, organization of traffic on a single track line and double track line, horizontal curve, vertical alignment, maximum longitudinal grade) (4).Train stations (classification, tracks, signals, equipment used in passenger and freight stations (4).Forces acting on the track (static and dynamic - vertical and horizontal, introduction to calculation of permanent way, Winkler, dynamic coefficient, subbase coefficient - c) (4).Permanent way elements:1. Rails: Production. Marks. Quality of steel. Types. Testing. Rails during use. Breakdown. Fatigue. Wear (vertical, lateral, undulating, folded), grease guns (4).2. Rail accessories: Fastening accessories. Problems. Structural solutions (Germany, France, England). Technical, operational, economic and other properties. Testing technical properties. Connection accessories. Glued insulating joint. Small accessories. Safety caps. Rail travel blocking devices (4).3. Sleepers: Steel sleepers. Advantages and shortcomings. Reinforced-concrete sleepers. Advantages and shortcomings. Durability of reinforced-concrete sleepers. Problems. Classification based on structural solution and materials. Wooden sleepers. Advantages and shortcomings. Fabrication, durability, and protection (4).LECTURES AND EXERCISES: 6th Semester (2 + 2)4. Ballast: Problems. Prism dimensions. Thickness. Calculation. Stress diagram (sleeper - formation). Materials. Ballast. Grain size and shape. Quality testing. Contamination. Screening (2).5. Special track accessories (points, turntables, travelling platforms, triangles, expansion devices) (2).Track layout in straight line and in curve. (Track in straight line - width, height, direction, regulations. Track in curve. Transition curves. Widening. Superelevation ramps. Generation of non-annulled lateral acceleration and three formulas for track superelevation. Track orientation - regulations. Direction arrows. Rectification methods for horizontal curves. Three-point method (6).Track inspection. Control of geometry. Inspection of individual elements. General inspection of the track (2).Track maintenance and repair. Regular maintenance. Seasonal maintenance. Periodic maintenance. Overhaul. Railway repair shed organization and schematic representation. Repair of track substructure. Replacement train. Track maintenance works (6).Track welding. AT weld. ET weld. Advantages and shortcomings. Comparison (2).Continuous welded rail: Advantages. Temperature and forces in continuous rail. Longitudinal resistance - p. Lateral resistance - w. Alleviating internal stress from continuous rails. Three stress alleviation methods (track lifting) (4)Special railways (3)				
Course contents auditory	5th Semester: Instructions, numerical examples and regulations as related to structural exercises (2).6th Semester: Instructions, numerical examples and regulations as related to structural exercises (4)				
Course contents constructsures	5th Semester: (13)1. Relocation of station tracks from zone "a" to zone "b" with stakeout plan on the scale of 1/500 (7)2. Reconstruction of an existing curve to increase the current speed limit (8).6th Semester: (26)1. Every student is given a different assignment and must independently reconstruction the existing turnout link in accordance with prevailing regulations (18).2. Students must produce the following drawings: railway cross section (various alternatives and combinations) (2) sleeper - rail link (various alternatives and combinations) (2) attachment accessories (supported or hanging) (2) standard rail cross section (2)				
Exam literature	Basic:1. Pollak, B.: Railways, Građevinski institut, FGZ, Zagreb, 1988.2. Marušić, D.: Design and Construction of Railways, Građevinski fakultet Sveučilišta u Splitu, 1994.3. Bajić, A.G.: Lecture OffprintsAdditional:P-314 Byelaw on Permanent Ways, Hrvatske željeznice, Zagreb.P-315 Byelaw on Track Substructure, Hrvatske željeznice, Zagreb.				
Knowledge evaluation	5th Semester: assignment submittal is a precondition for second signature6th Semester: assignment submittal is a precondition for second signaturewritten part of the examination (theory) and solution to the numerical assignment (turnout link calculation) - after the 6th semesteroral part of the examination (may be taken only by students who acquired at least 60 points during the written part of the examination)				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have completed Introduction to Railways Students cannot pass this course unless they have passed Introduction to Railways				
Proposal made by	(12.3.2007)				



Code WEB/ISVU	18558/22373	ECTS	5	Type	
Name	Regulation and Amelioration Drainage				
Status	5th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure)				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+120 (8+0+0+90+22)
Teachers	Danko Biondić , Nositelj predmeta, Diana Šustić , Diana Šustić , Diana Šustić ,				
Course objectives	Teaching the student to recognize the basic functionality of the system and structures of watercourse regulation and amelioration drainage, and the implementation of basic hydraulic calculations.				
Knowledge and competences	Acquiring basic knowledge on watercourse regulation and amelioration drainage as well as the basic skills in designing and sizing of canals and amelioration drainage systems.				
Values:	-				
How lectures are held	Issues are explained by presentation of numerous examples, from photographs of structures, design drawings, sketches, diagrams and graphs. Lectures are performed with aid of video and overhead projectors and the blackboard. Printoffs are handed out; lecture sketches are available via the internet. During lectures, students are invited to ask questions, while lectures are partially organized to allow for topical conversations and discussions.				
How auditory exercises are held	Instructions for segments of individual program preparation.				
How construction exercises are held	Students independently prepare a program, under lecturer's constant supervision and assistance.				
Course contents lectures	Purpose, problems and objective of regulation, role of regulation in water management (1). River bed morphology (2). Hydrological characteristics of natural watercourses, water regime, sediment regime, ice regime (1). Hydraulic calculations for natural and artificial watercourses; flow calculations, sediment flow, bed stability (5). Regulation works on watercourse bed, regulation structures (4). Regulation of water regime, interventions in the basin and regulation structures of water regime, operation (2). Amelioration drainage demands, purpose, objective (1). Baseline information for amelioration drainage (1). Surface drainage, preconditions and demand (1). Amelioration drainage canals, main geometrical and hydraulic elements (1). Determination of hydromodule of drainage and total flow, sizing of amelioration drainage canals (1). Structures on amelioration drainage canals and road network (1). Technology of construction of surface amelioration drainage systems (1). Subsurface drainage, preconditions and demand (1). Sizing of subsurface amelioration drainage systems, pipe drainage (1). Main geometrical and hydraulic elements of subsurface drainage systems (1). Materials and technology of construction of subsurface amelioration drainage systems (1). Irrigation, preconditions and demand (1). Types and methods of irrigation systems (1). Standard and hydromodule of irrigation (1). Structures of hydroamelioration systems for irrigation (1).				
Course contents auditory	Instructions for hydraulic calculations (3), Instructions for route design of canal network, hydrological and hydraulic calculations (3), Instructions for preparation of graphic materials (2).				
Course contents constructs	Hydraulic calculation for lateral canal bed (3), Calculation of bed stability (3), Route design of canal network (2), Inflow calculations (4), Hydraulic calculations of canal network (4), Preparation of characteristic canal cross sections (3), Preparation of canal longitudinal sections (3).				
Exam literature	Basic:0Priručnik za hidrotehničke melioracije I. Kolo, knjiga 3, Osnovna mreža, površinska odvodnja; knjiga 4, Detaljna mreža, podzemna odvodnja; knjiga 5, Građenje sustava površinske i podzemne odvodnje (Amelioration Drainage Manual/Main Network-Surface Drainage/Detailed Network- Subsurface Drainage/Construction of Surface and Subsurface Drainage Systems)0Josip Marušić: Separati iz površinske i podzemne odvodnje i navodnjavanja (Printoffs - Surface and Subsurface Drainage and Irrigation)0Živko Vuković: Osnove hidrotehnike, Prvi dio, druga knjiga (Introduction to Hydraulic Engineering)Additional:0M. Gjurović: Regulacije rijeka. (River Regulation)0E. Svetličić: Otvoreni vodotoci 00 regulacije. (Open Watercourses 00 Regulation)				
Knowledge evaluation	Programs (preparation and elaboration in preliminary exam of individual program; obligatory of signature), Written exam consists of two parts regulation and amelioration drainage. Oral exam, if the candidate scored over 60 % in written exam).				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have passed Introduction to Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Introduction to Hydraulic Structures Students cannot enroll in this course unless they have completed Hydrology and Hydraulics Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design Students cannot pass this course unless they have passed Introduction to Hydraulic Structures				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18563/22378	ECTS	5	Type	
Name	River Engineering				
Status	6th semester - Compulsory courses - Civil and Environmental Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (12+0+4+90+14)	
Teachers	dr.sc. Mladen Petričec dipl.ing.grad., Nositelj predmeta, Darko Barbalić , Darko Barbalić ,				
Course objectives	Connecting and expanding on acquired knowledge in hydrology, hydrogeology, psammology and river morphology, environmental protection, ecology of terrestrial waters and traditionally civil engineering technical disciplines with the aim to implement engineering solutions on natural watercourses to fulfil society demands and needs in terms of the use and protection of natural watercourses and their lowlands and the protection from adverse effects of water, such as floods, water-caused soil erosion, undesirable sediment deposits, etc.				
Knowledge and competences	Acquiring technical and ecological knowledge and skills related to implementation of civil engineering interventions on natural watercourses in order to fulfil all aspects of natural watercourse use and their protection as well as the protection from adverse effects of water in accordance with the modern principles of "sustainable development".				
Values:	-				
How lectures are held	Lectures are performed orally, in a lecture room, with use of modern IT equipment. As a part of auditory exercises, a visit to different structures on watercourses is planned.				
How auditory exercises are held	Solving exercises on the blackboard, with active student participation.				
How construction exercises are held	Preparation of a program in groups, under lecturer's supervision and assistance. The student selects a topic from the subject matter of the course, and independently, in consultations with the lecturer, prepares the work, which he then presents to his colleagues.				
Course contents lectures	Definitions, scope and principles of river engineering (2); Conditions and aspects of river use (2); Environmental impact of engineering interventions (2); River characteristics (3): hydrological and hydrogeological, hydraulic, psammologic and morphological, ecological and other characteristics; River water quality (3); River flora and fauna (3). Baseline information for engineering interventions on watercourses (2): cartographic information, aerophotogrametric and satellite images, geodetic surveys, hydrological and psammologic measurements and data processing, water quality monitoring; Engineering interventions on rivers (4): hydrological and morphological regulations, regulations of river beds for low, medium and high water levels, modification and route design of regulation bed, regulation structures, structures of watercourse crossings by traffic routes, pipelines and canals, repairs of errors and restoration of trained watercourses; Use of river inundations (2); Flood protection (3): preventive systems, line and complex systems, mountain and lowland retention storages and reservoirs, flood control and flood wave management; Flow management and river water use (2): management of reservoirs, distribution and priority water uses, regulation of low water level regime, biological minimum and ecologically acceptable flow; Regulation of river basins and impact on hydrological regime of the watercourse (2).				
Course contents auditory	Characteristics of natural watercourses, types of engineering interventions on natural watercourses and their environmental impact (4); River water quality, river flora and fauna, baseline information for engineering interventions (3); River reservoirs and retention storages, use of river inundation areas, regulation of river basins, flood protection systems (5).				
Course contents constructsures	Preparation of a program on one of the following topics: Characteristics of natural watercourses, types of engineering interventions on natural watercourses and their environmental impact (6). River water quality, river flora and fauna, baseline information for engineering interventions (6). River reservoirs and retention storages, use of river inundation areas, regulation of river basins, flood protection systems (6).				
Exam literature	Basic: 0 Internal course materials prepared by the lecturer. Additional: 0P. Ph. Jansen, L. van Bendegom, J. van den Berg, M. De Vries, A. Zanen: Principles of River Engineering; Pitman Pub. Lim.. London, 1979. 0J. L. Gardiner: River Projects and Conservation; John Wiley sons, Chichester, 1990. 0P. Calow G. E. Petts: The River Handbook 00 hydrological and ecological principles; Oxford, 1992. 0A. Brooks: Channelized Rivers 00 perspectives for environmental management; John Wily sons Ltd., Guildford, 1988.				
Knowledge evaluation	Three preliminary exams are possible for exemption from written exam. Written exam consists of 5 questions based on thematic units (max. 10 points per question). Oral exam, if the candidate scored 60% or more in written exam, consists of three randomly selected questions from the whole course subject matter.				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have passed Introduction to Hydrology and Hydraulics Students cannot enroll in this course unless they have passed Introduction to Hydraulic Structures Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18528/22343	ECTS	2	Type	
Name	Sociology of Work				
Status	2nd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+52 (4+0+4+37+7)
Teachers	mr.sc. Slavko Belić dipl.soc, Nositelj predmeta, mr.sc. Slavko Belić dipl.soc, mr.sc. Slavko Belić dipl.soc,				
Course objectives	Students are introduced to the problems of the work and life in a modern day company, in order to facilitate their future integration and socialization in the work environment. According to P. Drucker, the integration of engineers in work environment is the principal problem encountered in present-day companies. The aim of the course is to point to the significance of joint work of engineers, technologists, sociologists and other scientists, as such joint efforts are sure to result in easier harmonization of technical and social innovations.				
Knowledge and competences	Knowledge needed for the development and selection of techniques and methods in research and project management. Skills needed for teamwork through participation in joint assignments (exercises).				
Values:	-				
How lectures are held	Lectures are grouped around some key problems considered in the Sociology of Work: development of techniques and work technologies, forms of social organizations and social life in manufacturing systems, influence of technological development on the life of a wider social community, how these key problems of work structuring are reflected in profit-oriented companies as compared to state companies, and to companies where profitability is dependent on general development of the society, i.e. on development of highest social values.				
How auditory exercises are held	Analysis of key issues opened during lectures (feed-back data).				
How seminar exercises are held	Report presentation skills, work group management, discussions.				
How methodology exercises are held	Introduction to methods highly valuable to civil engineers.				
Course contents lectures	Notion of organization, social structure of companies (1). Employee and technical level of production (1). Work expectations and satisfaction with work (1). Job changing - traditional and readily adjustable company (1). Company management controversies (1). Management practice and power structure (1). Various social dimensions in companies (1). Social roots of an innovative company (1). Specificities of socio-technical system encountered in construction companies (1). Communications system (1). Social dimension of structure development in construction companies (1). Management in construction companies (1). Construction company and work site (1). Company and its surroundings (1). Link establishment strategy (1).				
Course contents auditory	Behaviour of employees in a work group and an informal environment (2) role of managers (1), power dynamics (1).				
Course contents seminars	Preparation of reports (students are welcome to select a preferred topic among those covered by the course) (4).				
Course contents methodology	Sociogram, observation, collection and processing of data in the scope of a research project (2), relationship between theory and practice (1), realization of projects (2), survey and questionnaire (2).				
Exam literature	Basic: Material from lectures and exercises. Friedmann, G., Naville, P.: Sociology of Work, V. Masleša, Sarajevo, 1972. Additional: Bahtijarević-Šiber et al: Theory of Management, Informator, Zagreb, 1991. Miller, D.C. Form, V.H, Industrial Sociology, Panorama, Zagreb.				
Knowledge evaluation	The oral part of the examination is open to students who obtained at least 60% of all points during the written examination.				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18531/22346	ECTS	5	Type	
Name	Soil Mechanics				
Status	3rd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+122 (0+0+2+92+28)	
Teachers	dr.sc. Sonja Zlatović , prof.v.šk., Nositelj predmeta, mr.sc. Željko Lebo dipl.ing.građ, mr.sc. Željko Lebo dipl.ing.građ, mr.sc. Željko Lebo dipl.ing.građ, dr.sc. Sonja Zlatović , prof.v.šk., dr.sc. Sonja Zlatović , prof.v.šk., dr.sc. Sonja Zlatović , prof.v.šk.,				
Course objectives	Understanding of soil behaviour and preparation for solving geotechnical problems.				
Knowledge and competences	Students learn the basic soil properties, ways of their measurement (in laboratory and in situ) and description, for soil element as well as for the complete soil mass; effects of water on soil behaviour, quick condition. Student learns to recognize the situations in which stability analysis is necessary for a slope.				
Values:	-				
How lectures are held	At least a simple overview of a case history is used during each lecture to introduce a problem (with plentiful of photographs, videos etc). Simple models are used to explain processes in soil. Investigation sites are visited as well as geotechnical laboratory and constructions sites. Active Learning Critical Thinking frame is used.				
How auditory exercises are held	Problems are solved in the classroom. Active Learning Critical Thinking frame is used. Distant learning is used.				
How seminar exercises are held	Students prepare seminars in teams (2 persons) and present them for the whole group.				
How construction exercises are held	Students solve individual assignments.				
Course contents lectures	Role of Soil mechanics. (1) Structure, fabric. (1) Relative volume, water content, density. (2) Soil classification, indexes. (2) Groundwater, permeability, freezing. (1) Effective stress concept. (1) Pore pressure, piezometer, flow, buoyancy water pressure, seepage forces, quick condition. (4) Compression and consolidation: the oedometer test, one-dimensional compression and consolidation, settlement (4). Soil strength, direct shear and triaxial apparatus, peak and residual strength, undrained strength, critical states/steady state. (4) Geotechnical investigations, ground investigation report, Euro Code. (4) Landslides, slope stability: simple procedures, remedial works. (6)				
Course contents auditory	Examples: 1. stresses in horizontally layered soil, effects of a steady water flow, effects of excavation, effects of change of water table, quick condition (6); settlement due to change of water table, excavation, fill (2); 2. the infinite slope (1); Geoslope (1).				
Course contents seminars	Student is choosing a detail specially interested in.				
Course contents constructs	Two assignments: 1. stresses in horizontally layered soil, without flow, with steady flow up and down; hydraulic gradient; settlement due to excavation, fill (8). 2. slope stability analysis for an infinite slope and embankment in three various water regimes.				
Exam literature	Basic literature:1. Notes, exercises, materials http://line.tvz.hr/zlatovic2 . Zlatović,S, 2005, Introduction to Soil Mechanics, notes with exercises for students (in Croatian with English terms)3. Nonveiller,E: Soil Mechanics. Foundations. (in Croatian) Školska knjiga, Zagreb, 1979, 1981Additional literature:1. Nonveiller,E.: Kličenje i stabilizacije kosina, Školska knjiga, Zagreb, 1987, 204 str2. Lambe,T.W., Whitman,R.V.: Soil Mechanics, John Wiley Sons, Inc. , New York, 1969, 553 str3. Bowles,J.E.: Foundation Engineering Handbook, Van Nostrand Reinhold Co., New York, 1982, 752 str.4. Geoslope, student version, http://www.geo-slope.com/downloads/student.asp				
Knowledge evaluation	Assignments, two, prepared with solutions,Tests, three, 50% are required, with 75% of points: written examination is not necessaryExaminations: written part: problems, oral part: recognition of a problem, way to solution				
Prerequisites:	Students cannot enroll in this course unless they have completed Elementary Geology Students cannot enroll in this course unless they have completed Construction Materials Students cannot enroll in this course unless they have passed Engineering Mechanics Students cannot enroll in this course unless they have passed Mathematics I				
Proposal made by	(05.10.2007)				



Code WEB/ISVU	18532/22347	ECTS	5	Type	
Name	Steel Structures				
Status	3rd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+121 (9+0+0+91+21)
Teachers	prof.vis.šk. Boris Baljkaš , Nositelj predmeta, Krunoslav Pavković dipl.ing., Krunoslav Pavković dipl.ing.,				
Course objectives	The students will acquire basic knowledge about the shaping, design, calculation, safety and realization of steel structures.				
Knowledge and competences	Participation in the design, supervision and construction of metallic structures.				
Values:	-				
How lectures are held	Actual structures are presented in the stage of design, fabrication and erection by Student group size means of drawings, photographs and video presentations.				
How auditory exercises are held	Presentation of structures through drawings, and explanations relating to preparation of structural design documents.				
How construction exercises are held	Independent elaboration of design documents for structures. Design work and working drawings.				
Course contents lectures	Introduction and historic overview of metal structures (2). Significance of steel, steel alloys, production procedures, properties and types of steel used in construction (2). Steel and aluminium products (1). Load and safety (2). Structural shaping and types of structures: ordinary girders, trusses, skeleton girders, composite girders, bridges (4). Design of halls and multi-storey skeletal structures (3). Load bearing capacity calculation for cross sections and structural elements, regulations pertaining to steel structures (3). Shaping and designing connections (2). Mechanical connection (1). Welding and technology for the realization of welded connections (2). Aluminium alloy structures (1). Corrosion protection and fire protection (2). Fabrication and assembly, quality control and organization of production plant for the fabrication of structures (4). Examples of structural collapse and presentation of causes of collapse (1).				
Course contents auditory	Selecting form of structure and preparing its general plan (2). Selecting form of secondary elements and design of such elements (2). Main girder shaping and designing (2). Shaping and designing connection details (2). Production of workshop drawings, technical descriptions and quantities of materials (1).				
Course contents constructs	Preparing general plan of the structure (2). Secondary girder design (2). Load parameters and main girder design. (4). Design of main girder elements (3). Shaping connection details, connection method determination and calculation of bearing capacity (3). Elaboration of workshop drawing for the main girder with all typical details (5). Preparation of technical descriptions and material consumption list (1). Structural assembly sequence (1).				
Exam literature	Basic literature:1. B. Androić, D. Džeba, I. Dujmović, STEEL STRUCTURES I, Udžbenik sveučilišta u Zagrebu, Građevinski fakultet, Published by: IGH Zagreb 1994.2. A. Vukov: INTRODUCTION TO METALLIC STRUCTURES, Publisher: Faculty of Civil Engineering, University of Split, 1988.Additional literature:1. TECHNICAL ENCYCLOPAEDIA: Steel, Steel Structures, Aluminium Structures, HLZ, Zagreb.2. B. Androić, D. Džeba, I. Dujmović: STEEL STRUCTURES 4, Udžbenik sveučilišta u Zagrebu, Građevinski fakultet, Publisher: IA PROJEKTIRANJE, Zagreb, 2003.3. Helmut C. Schultz, Werner Sobek, Karl J. Habermann: STEEL CONSTRUCTION MANUAL, Publisher: Birkhauser Verlag Detail Edition, Basel, 1999.4. L. V. Leech: STRUCTURAL STEELWORK FOR STUDENTS, Butterworth Co., London 1988. Literature under item 3, languages English or German, www.detail.de				
Knowledge evaluation	The written part of the examination consists of a typical design problem and five questions.The oral part of the examination may be taken only by students that acquired at least 60 percent of points during the written examination. During this examination, the student is expected to elaborate on solutions used in the written part of the examination, and is also expected to answer questions pertaining to this course.				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have passed Descriptive Geometry in Civil Engineering I Students cannot enroll in this course unless they have passed Structural Design Students cannot enroll in this course unless they have completed Construction Materials Students cannot enroll in this course unless they have passed Mathematics I				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18525/22334	ECTS	6	Type	
Name	Structural Design				
Status	2nd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+150 (30+0+0+120+0)
Teachers	mr.sc. Zorislav Despot dipl.ing.građ, Nositelj predmeta, Dobriša Adamec , mr.sc. Ljerka Kopričanec-Matijevac viši predavač, mr.sc. Željko Lebo dipl.ing.građ, dr.sc. Heinrich Werner prof.v.škole,				
Course objectives	Students will acquire basic theoretical and practical knowledge on the structural design, and will hence be able to better understand design documents and solve simple structural problems when they are encountered during the construction process.				
Knowledge and competences	Assessment of statically determinate and indeterminate static structural systems.Assessment of displacement and deformation of static structural systems.				
Values:	-				
How lectures are held	Basic theoretical and practical notions about structural design are explained.The state of equilibrium, internal forces, and displacement are studied by means of structural models. Similar practical examples are explained.Additional explanations are provided in lecture notes recently prepared for this course.				
How laboratory exercises are held	The exercises are performed in the computer room				
Course contents lectures	Structural modelling basics. Statical system classification. Straight load bearing structures. Notion of geometrical invariability and statical determination. Correlations.Classification of straight statical systems (8).Statically determinate girders. Classification according to design method (2).Statically indeterminate girders. Design methods used for statically indeterminate girders (2).Physical interpretation of the force method (6).Physical interpretation of the displacement method. Iterative procedures (6).Brief presentation of the finite element method. Plates and shells, massive structures. Overview of recent educational and professional FEM software packages. Input and output generators (6).				
Course contents auditory	Statically determinate girders (12); Statically indeterminate girders. Force method (12)				
Course contents constructs	Computer-aided structural model design (6)				
Exam literature	Basic:H. Werner, Engineering Mechanics, Lecture Notes, Zagreb, 1986.Z. Despot, Lecture Offprints,V. Simović, Building statics I, Građevinski institut, ZagrebAdditional:V. Šimić, Resistance of materials I, Školska knjiga, Zagreb, 1992.V. Šimić, Resistance of materials II, Školska knjiga, Zagreb, 1995.M. Anđelić, Statics of indeterminate structures, DHGK, Zagreb, 1993.Manuals for the use of FEAT and TOWER programs.Various problems and lecture offprints can be found on the web pages www.ljerka.com which is updated on a regular basis.				
Remark	Students that pass this examination are considered qualified to attend specialized structural design courses.				
Prerequisites:	Students cannot enroll in this course unless they have completed Engineering Mechanics Students cannot pass this course unless they have passed Engineering Mechanics				
Proposal made by	(15.08.2011)				



Code WEB/ISVU	18566/22381	ECTS	2	Type	
Name	Transport and Environment				
Status	6th semester - Compulsory courses - Civil and Environmental Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				15+45 (8+0+7+30+0)
Teachers	Željko Koren , Nositelj predmeta, Željko Koren , Željko Koren ,				
Course objectives	Teaching the student to recognize impacts of road construction and ongoing traffic on the environment and plan and implement protection measures to eliminate or decrease unfavourable impacts.				
Knowledge and competences	Competence to recognize and participate in implementation of traffic routes (participation during planning, design, construction and exploitation), primarily related to impact and risk of environmental pollution/contamination.				
Values:	-				
How lectures are held	Performed orally, in a lecture room, with use of modern IT equipment. As part of auditory exercises, field work is planned for gaining insight into characteristic examples of interaction between traffic routes and the environment.				
How auditory exercises are held	Solving tasks on the blackboard, with active student participation.				
How seminar exercises are held	Work in groups on defined topics, based on solved tasks. Insisting on own solution proposals to problems by students.				
Course contents lectures	Design, construction and use of traffic routes based on principle of sustainable development (1). Traffic route definition in harmony with landscape (2). Roads, motorways, city roads, ancillary facilities, railroads, navigable canals (2) Impacts of traffic activities on air, water, soil, flora and fauna, natural and cultural heritage monuments, specially protected areas (2). Protection measures against exhaust fumes, noise, light, preservation of protected biotopes (2). Use of vegetation for decrease in air temperature and wind power, increase in relative humidity, noise reduction and dust filtration. Walls as sound barriers, light blockage (2). Regulation of road environment (2). Maintenance of protective structures. Additional costs of implementing environmental protection (2).				
Course contents auditory	Solution examples structures built to protect the environment and nature values (8).				
Course contents seminars	In selected groups, covering one of the following four seminar topics (7): fitting traffic routes into the environment, use of vegetation for reduction of unfavourable impacts of traffic routes on the environment, protection systems against wastewater from traffic routes, constructed barriers against noise and air pollution.				
Knowledge evaluation	Seminar/program preparation, elaboration and presentation. Written exam consists of theoretical questions and exercises. Oral exam, if the candidate made special efforts in seminar preparation and/or scored over 60% in written exam.				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have passed Environmental Protection Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18561/22376	ECTS	5	Type	
Name	Waste Management				
Status	5th semester - Compulsory courses - Civil and Environmental Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (12+0+18+90+0)	
Teachers	Zlatko Milanović , Nositelj predmeta, Tomislav Domanovac , Tomislav Domanovac ,				
Course objectives	Qualifying the student to recognize and independently solve waste problems.				
Knowledge and competences	Acquiring knowledge on waste management methods, identification of waste problems and finding economical and environment-friendly solutions to reduce, recycle and dispose of waste, particularly construction-related waste.				
Values:	-				
How lectures are held	Interactive understanding of waste, particularly waste in modern society. Differentiating between waste types and states, i.e. structure. Connecting construction activities and waste production. Studying the connection of production/construction technologies and waste reduction and recycling. Acquired knowledge will be tested at construction sites and waste disposals. Learning about methods of waste analysis and evaluation.				
How auditory exercises are held	Solving concrete tasks, with active student participation.				
How seminar exercises are held	Work in groups on solving defined problems, based on solved tasks. Insisting on own solution proposals to problems by students.				
Course contents lectures	Differentiating between waste and garbage (2) Waste quantities, volume, composition, structure and humidity. Waste types (3). Waste avoidance and reduction (2). Recycling of waste and garbage (3). Use and subsequent processing of waste and garbage (2). Waste and garbage disposal (3). Hazardous waste (1).				
Course contents auditory	Solving tasks related to construction waste: Supervision of flow (1) Collection (1). Transport (1). Recycling (2). Disposal (2). Communication (1) Visit to construction sites and learning about actual practice of waste handling. Visit to a waste disposal site and construction waste recycling plant.				
Course contents seminars	Expansion on knowledge acquired during lectures and exercises in particular. Work in interest groups. Individual work based on student interest and topic selected in auditory exercises.				
Exam literature	Basic literature:1. Zlatko Milanović i dr.: Otpad nije smeće, Gospodarstvo i okoliš / Mtg-topograf, Zagreb 2002. (Waste Is Not Garbage)2. Zlatko Milanović: Deponij, trajno odlaganje otpada, ZGO Zagreb 1992. (Disposal Site 00 Permanent Disposal of Waste) 3. Vladimir Potočnik V.: Obrada komunalnog otpada 00 svjetska iskustva MTG Consulting, Velika Gorica 1997. (Processing Municipal Waste 00 Worldwide Experiences)4. Grupa autora: BIOEN, Energetski institut Hrvoje Požar, Zagreb 1998.Additional literature:1. Das Umweltlexikon, Institut fuer angewandte Umweltforschung, Kippenheuer / Witsch, 1993 Koeln 1,000 Terms in Solid Waste Management, ISWA Kopenhagen 1992.2. Grupa autora: Ekološki leksikon, Barbat Zagreb 2001. (Glossary of Ecology)				
Knowledge evaluation	Attendance of auditory exercises.Seminar preparation and elaboration.Written and oral exam.				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have passed Introduction to Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Hydrology and Hydraulics Students cannot enroll in this course unless they have passed Environmental Protection Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18564/22379	ECTS	5	Type	
Name	Water Pollution Control				
Status	5th semester - Compulsory courses - Civil and Environmental Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (14+0+16+90+0)	
Teachers	mr.sc. Gorana Čosić-Flajsig viši predavač, Nositelj predmeta, mr.sc. Gorana Čosić-Flajsig viši predavač, mr.sc. Gorana Čosić-Flajsig viši predavač,				
Course objectives	Teaching the student to recognize problems of environmental protection, particularly water, and use structural measures to reduce input of pollution via wastewater in the environment.				
Knowledge and competences	Acquiring ability to understand and explain water protection issues; elementary ecological characteristics of water; definition of sources and types of pollution/contamination and their impact on water status, adoption of measures and activities of water protection and participation in planning and problem-solving in the field of water pollution control.				
Values:	-				
How lectures are held	Lectures are performed in a lecture room, with the use of modern equipment. More active student participation is achieved by means of questions and discussions during lectures. A visit to a laboratory and characteristic locations.				
How auditory exercises are held	Solving practical tasks on the blackboard, with active student participation.				
How construction exercises are held	Preparation of a program in groups, under lecturer's supervision and assistance. The student chooses a course topic and independently, in consultations with the lecturer, prepares his work, which he then presents to his colleagues.				
Course contents lectures	Water protection issues (2); Basic ecological characteristics of water and description of water conditions (3). Sources and types of pollution; impact of pollution on water status (4). Legal and other measures and activities in the field of water protection (4). Basic procedures and processes applied in water and waste water treatment (4). Municipal wastewater treatment plants (5). Basic procedures and measures applied to reduce the impact of point sources of pollution (4). Water pollution planning (2). Environmental impact studies (2).				
Course contents auditory	Examples of pollution load calculations (2). Determination of water typology (2). Determination of waste substances concentrations in water bodies (2). Determination of oxygen deficit curve (2). Sizing of plants with I. treatment level (3). Sizing of aeration basins, lagoons and constructed wetlands (3).				
Course contents constructsures	Preparation of a work related to the following areas: pollution loads (4) ; water typology (2); initial and subsequent dilution (2); oxygen deficit curve (2); plant with I. treatment level (3); plant with II. treatment level (3).				
Exam literature	Basic:05. Tedeschi: Zaštita vodnih sustava i pročišćavanje otpadnih voda, Građevinski institut, Zagreb, 1996. (Water Systems Protection and Wastewater Treatment)0J. Margeta: Osnove gospodarenja vodama, Građevinski fakultet Split, 1992. (Introduction to Water Management)Additional:0J. Margeta: Guidelines on Sewage Treatment and Disposal for the Mediterranean Region, WHO-GEF, Athens, 2004.				
Knowledge evaluation	Program preparation and defense. Two preliminary exams: (i) Basic characteristics of water and water pollution; (ii) Procedures for control of water pollution sources; 50% for signature appending. Written exam consists of solving individual tasks and answering questions. Oral exam, if the candidate scored 60% or more in the written exam.				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have passed Introduction to Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Hydrology and Hydraulics Students cannot enroll in this course unless they have passed Environmental Protection Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18565/22380	ECTS	5	Type	
Name	Water Quality				
Status	5th semester - Compulsory courses - Civil and Environmental Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120	(0+7+8+105+0)
Teachers	dr.sc. Slavko Šobot , Nositelj predmeta, dr.sc. Slavko Šobot , dr.sc. Slavko Šobot ,				
Course objectives	Teaching the students to recognize the significance and role of chemical and microbiological parameters in the preparation and processing of different water types.				
Knowledge and competences	Acquiring competence to evaluate water quality based on regulations, prepare a monitoring plan and laboratory analyses of water status, and knowledge of water analysis processes.				
Values:	-				
How lectures are held	Lectures are given with the aid of modern educational tools and graphic presentations. Thematic units. Lectures and explanations will be partly organized at the Main Water Management Laboratory of Croatian Water.				
How laboratory exercises are held	At the laboratory, the students will gain insight into the entire process of water quality testing, with focus on chemical and microbiological parameters.				
How seminar exercises are held	Students will prepare seminars on selected thematic units, which will be performed in groups under lecturer's supervision and assistance and later publicly presented.				
Course contents lectures	Introduction and basic terms (2): importance and distribution of water, water types, chemical composition, sanitary quality of water; Drinking water (7): basic terms, groundwater, sources, chemical composition, microorganisms, processing and preparation of drinking water and water supply, legislation; Surface waters (7): water in the nature, water quality, monitoring, parameters and quality evaluation, legislation; Wastewater (7): basic terms, composition and types, wastewater discharges and treatment, legislation; Technological water (5): composition, types, water processing and preparation procedures; Pollution/contamination (2): sources and mitigation, legislation.				
Course contents laboratory	visit to a laboratory, work in smaller groups, demonstration exercises basic laboratory measurement techniques for concentrations of certain parameters physical/chemical parameters: pH, temperature, conductivity, dissolved oxygen; water hardness, alkalinity (titrimetry); COD, BOD, suspended matter, demonstration exercise in microbiology, use of microscope (7).				
Course contents seminars	Seminars are planned in the following areas: drinking water (2), characteristics of surface water and groundwater (2), domestic and technological wastewater (2), pollution and contamination (2).				
Exam literature	Basic literature:1. Printoffs are prepared by the lecturer2. Valić i sur. Zdravstvena ekologija, Medicinska naklada, Zagreb 2001. (Health Ecology)Additional literature:1. S. Tedesci: Zaštita vodnih sustava i pročišćavanje otpadnih voda, Građevinski institut, Zagreb 1996. (Water Systems Protection and Wastewater Treatment)2. Državni plan za zaštitu voda (National Water Protection Plan)3. Županijski planovi zaštite voda (County Water Protection Plans)				
Knowledge evaluation	Seminar presentation and defence.Oral exam.				
Prerequisites:	Students cannot enroll in this course unless they have passed Introduction to Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Hydrology and Hydraulics Students cannot enroll in this course unless they have passed Environmental Protection Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18559/22374	ECTS	4	Type	
Name	Water Supply and Sewerage I				
Status	5th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure)				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)				30+90 (15+0+0+75+0)
Teachers	Stjepan Kordek dipl.ing.građ., Nositelj predmeta, Dejan Kovačević dipl.ing.građ.,				
Course objectives	Qualifying the student to understand and solve problems related to hydraulic structures of water supply, sewerage and wastewater treatment.				
Knowledge and competences	Student develops competence to work in municipal companies, to take part in design and organization of construction as well as independent organization of construction and maintenance of hydraulic structures of water supply and sewerage.				
Values:	-				
How lectures are held	Oral presentations, with use of modern educational tools. Graphic presentations and photographs of structures, from design phase to construction and exploitation.				
How auditory exercises are held	Presentation of calculations and drawings of structures and design elements for structures.				
How construction exercises are held	Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities.				
Course contents lectures	Water supply: Introduction, significance of water and water supply, characteristics of water, investigation works (4). Users and used quantities, water supply systems (4). Water sources, intake structures, calculations and design (8). Pipelines, water supply networks, pipe types, sizing and projects (6). Facilities on a water supply system (water storage tanks, pumping stations), sizing of facilities and pumps (6). Facilities on pipeline route (2). Sewerage: Introduction, sewerage systems, wastewater types (2). Design wastewater quantities, canal types (4), Sizing of sewerage system, minimum profiles and falls of canal bottom (3). Facilities on a sewerage network (syphons, diversion structures), retention storages (3). Sewerage pumping stations, outlet structures (3).				
Course contents auditory	Calculations of water consumption, intake structures (1). Design of water storage tanks and pumping stations (3) Installation plans and pipe dimensions (2). Calculations of wastewater quantities, longitudinal falls, sizing of facilities on the network (4).				
Course contents constructs	Layout plan of a water supply system and network, design of intakes (4). Design and selection of a water storage tank, installation plan, design of pumping stations and selection of pumps; Q/H diagrams (3) Calculation of pipeline and network, general longitudinal profiles. Technical description of structures and system (2). Development of concept design of city network and calculations (4). Calculations and design of diversion structures and syphons (4). Layout plan of the system, technical report (3)				
Exam literature	Basic literature:1. Printoffs prepared by lecturer.2. Mutschmann i Stimmelmayer: Priručnik opskrbe vodom, Građevinska knjiga, 1988. 00 Beograd (Water Supply Manual)3. Gulić: Opskrba vodom, DGH 00 Zagreb (Water Supply)4. J. Margeta: Kanalizacija naselja 00 Split, 1998. (Sewerage of Settlements)Additional literature:1. Abramov: Snabdjevanje vodom, Građevinska knjiga, Beograd; (Water Supply)2. Schulze: Wasserversorgung;3. Purschel: Kommunale Wasserversorgung;4. Fair 00 Geyer: Elements of water supply and Waste 00 Water Disposal 00 John Wiley;5. Steel, McGhee: Water supply and Sewerage International student Edition 00 McGraw-Hill;6. Abwassertechnik, I i II 00 Verlag W. Ernst und Sohn Berlin 00 Munchen, 1982.;7. Kanalizacija 00 Žukov, Jakovljen 00 Moskva, 1964.; (Sewerage)8. Stadtentwässerung, Hosang und Bischof 00 Feabner, Stuttgart, 1979.9. Abwasserbehandlung, Purschel, Westermann, Berlin, 1967.				
Knowledge evaluation	Two preliminary exams for water supply and two for sewerage (two per semester) (min. 25%, score over 60% for exemption from written exam);Program prepared and submitted (one per semester).Written and oral exam (over 60 % scored in written exam).				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have passed Introduction to Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Introduction to Hydraulic Structures Students cannot enroll in this course unless they have completed Hydrology and Hydraulics Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design Students cannot pass this course unless they have passed Introduction to Hydraulic Structures				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18576/39174	ECTS	2	Type	
Name	Water Supply and Sewerage II				
Status	6th semester - Compulsory courses - Civil Engineering (Water and traffic infrastructure)				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			15+46	(15+0+15+16+0)
Teachers	mr.sc. Gorana Čosić-Flajsig viši predavač, Nositelj predmeta, mr.sc. Gorana Čosić-Flajsig viši predavač, mr.sc. Gorana Čosić-Flajsig viši predavač,				
Course objectives					
Knowledge and competences					
Values:	-				
Prerequisites:	Students cannot enroll in this course unless they have completed Water Supply and Sewerage I Students cannot pass this course unless they have passed Water Supply and Sewerage I				
Proposal made by	(22.09.2008)				



Code WEB/ISVU	18562/22377	ECTS	5	Type	
Name	Water Use				
Status	5th semester - Compulsory courses - Civil and Environmental Engineering				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+120 (15+0+15+90+0)	
Teachers	mr.sc. Gorana Čosić-Flajsig viši predavač, Nositelj predmeta, mr.sc. Gorana Čosić-Flajsig viši predavač, mr.sc. Gorana Čosić-Flajsig viši predavač, dr.sc. Mladen Petrićec dipl.ing.građ., dr.sc. Mladen Petrićec dipl.ing.građ.,				
Course objectives	Acquiring basic theoretical and practical knowledge about water use for human consumption, food production, nature and other purposes.				
Knowledge and competences	Teaching the student to independently work in water supply, irrigation, hydropower generation and other systems of water use.				
Values:	-				
How lectures are held	Theoretical lectures aided by technical equipment and occasional visit to a building site. Students receive lecture printoffs, which are available via the internet. Lectures are interactive - students are invited to ask questions, and lectures are in part dedicated to discussions and drawing conclusions as a manner of preparation for future practical work.				
How auditory exercises are held	Problem-solving on the blackboard, with active student participation.				
How seminar exercises are held	Preparation of a program in groups, under lecturer's supervision and assistance. The student chooses a course topic, and independently, in consultations with the lecturer, prepares the work, which he then presents to his colleagues.				
How construction exercises are held	Preparation of a program in groups, under lecturer's supervision and assistance. The student chooses a course topic, and independently, in consultations with the lecturer, prepares the work, which he then presents to his colleagues.				
Course contents lectures	Water use development - background: Water demand: water for people, water for food, water for other water users and nature (2). Water supply: Introduction, issues and significance of water supply, water characteristics (1). Consumption and consumers (1). Water sources, water intakes (2). Pipelines, types, main characteristics, water supply networks, basic calculations, pressure testing (2). Water storage reservoirs, role, types, forms (2). Facilities on a water supply system (1). Pumping stations, pump types, basic data and characteristics (1). Treatment for water supply, main components (2). Sedimentation tanks, water filtration, disinfection (2). Irrigation: Introduction to hydrotechnical amelioration practices: significance and necessity of soil improvement practices (1); conditions and necessity of irrigation (1). Soil and water requirements of plant cultivation (1). Types and methods of irrigation (2). Standards and hydromodule for irrigation (1). Irrigation objects (2). Use of hydropower: Water power and energy in nature. Principles of use of hydropower and energy (1). Role of hydropower in economy and demands for power and energy (1). Changes in space caused by hydropower plant construction (1). Hydropower calculations and water flow analyses (1). Sport, recreation and other uses of water: general insight into other water uses (2). Visit to building sites during semester.				
Course contents auditory	presentation of calculations and examples of subject matter dealt with in lectures (15).				
Course contents constructs	preparation of an individual program based on lecture topics: Water supply of settlements (5); Irrigation (4). Other water uses (6).				
Exam literature	Basic literature:1. Gulić, Ivan: Opskrba vodom. HSGI, Zagreb 2000., str.325. (Water Supply)2. Gereš, Dragutin: Navodnjavanje. Građevni godišnjak96., HGDI, Zagreb, 1996., str. 315-390. (Irrigation)Additional literature:1. Mutschmann i Stimmelmayer: Priručnik opskrbe vodom, Građevinska knjiga,1995., (Water Supply Manual) Beograd 2. Fair-Geyer: Elements of Water Supply and Waste - Water Disposal - John Wiley;3. Kos, Zorko: Hidrotehničke melioracije-navodnjavanje, Školska knjiga, Zagreb, 1987. (Hydrotechnical amelioration)4. Priručnik za hidrotehničke melioracije, I kolo; II kolo i III kolo - odabrana poglavlja; Hrvatsko društvo za odvodnju i navodnjavanje. Grupa autora, Zagreb,1985. 00 2003. (Soil Improvement Manual)5. Vuković, Živko: Osnove hidrotehnike I/1 I/2, Akvamarine, Zagreb, 1996. (Introduction To Hydraulic Engineering)6. Stojić, Petar: Hidroenergetika, FGZ Split, 1995. (Hydropower Engineering)				
Knowledge evaluation	Programs: preparation and preliminary exams for two individual programs, mandatory for signature appending.Written exam consists of task solving and theoretical questions.Oral exam, if the candidate scored 60 % or more in written exam, consists of explanations of phenomena, relations and problem-solving.				
Remark	Possible preparation of graduation paper.				
Prerequisites:	Students cannot enroll in this course unless they have passed Introduction to Hydrology and Hydraulics Students cannot enroll in this course unless they have completed Hydrology and Hydraulics Students cannot enroll in this course unless they have passed Environmental Protection Students cannot enroll in this course unless they have passed Mathematics II Students cannot enroll in this course unless they have passed Structural Design				
Proposal made by	(09.05.2005)				



Code WEB/ISVU	18534/22349	ECTS	5	Type	
Name	Wooden Structures				
Status	3rd semester - Compulsory courses				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction)			30+121 (6+0+0+91+24)	
Teachers	prof.vis.šk. Boris Baljkas , Nositelj predmeta, mr.sc. Miroslav Magerle dipl.ing.grad, Krunoslav Pavković dipl.ing., Krunoslav Pavković dipl.ing.,				
Course objectives	The course is aimed to prepare students to participate, either as contractors or works supervisors, in the realization of wooden structures and structures made of laminated materials, with the particular emphasis on the durability and fire resistance.				
Knowledge and competences	Students will be able to independently form and dimension wooden structures and structures made of laminated materials, and to prepare workshop and design documents for the realization of such structures.				
Values:	-				
How lectures are held	Students will be informed through visual materials (slides, transparencies) about wooden structures built all over the work, and about various possibilities for the application of wooden structures. The design and shaping of wooden structures is presented in a simple manner through written material about topics covered during the lectures. Numerical examples are provided for every significant issue considered in the course. To keep students focused and attentive, they are required to answer appropriate questions during the lectures.				
How auditory exercises are held	Students are given instructions and example for the preparation of individual programs.				
How construction exercises are held	Each student will prepare a summarized design of a wooden roof truss. The written portion of the design will be produced using MS Word or MS Excel. Drawings will be produced in AutoCAD or another appropriate software program.				
Course contents lectures	Historic development of wooden structures (2). Systems, Methodological Approach and Slides of Completed Structures (2). Properties of Monolithic, Glued and Laminated Materials Made of and Based on Wood (2). Durability and Fire Resistance (2). Design of Monolithic Wooden Structures (2). Design of Glued-Laminated Structures and Panel Structures (2). Connection Elements in Wooden Structures (2). Connection of Elements with Direct and Indirect Transfer of Forces (4). Composite Compression Members and Members Subjected to Bending Load (2). Node Design for Truss Girders - Traditional and Modern Approaches (2). Stability in Space of Wooden Structures (2). Introduction to the Design and Shaping of Connections for Glued-Laminated Structures (2). Transport and Assembly of Wooden Structures (2).				
Course contents auditory	Plan Disposition of Roof Structures (2). Analysis of Loads Acting on Roof Structures (2). Design of Truss Elements - Examples (2).				
Course contents constructs	Preparing layout plan for a specified roof truss, with transverse and longitudinal cross sections (4). Load analysis for the secondary load-bearing structure and design of secondary structure elements (4). Analysis of loads acting on the roof truss, determination of internal forces, design (4). Design of composite structures to enhance stability in space of wooden trusses (2). Preparation of working drawings for a roof structure (cross section and typical details) (4).				
Exam literature	Basic literature:1. M. Magerle: Wooden Structures, Properties of Wood, PTI, IGH, Zagreb, 1996 (University Textbook).2. Z. Žagar: Wooden Structures, Volume I, Basic Design of Wooden Structures, Pretei, Zagreb, 1999 (University Textbook)3. Standards for the design and realization of wooden structures (HRN and DIN).4. Written material prepared by the lecturer.Additional literature:1. Droege/Stoy: Grundzuege des neuzeitlichen Holzbaues, Band 1, Konstruktionselemente, Berechnung und Ausfrung, Verlag von Wilchem ErnstSohn, Berlin Mnchen, 1981.2. M. Gggel: Bemessung im Holzbau, Konstruktionsregeln, Formeln, Tafeln, Rechenwegwe in Beispielen, Bauverlag GmbH, Wisbaden und Berlin, 1980.3. EURO CODE 1995-1-1: Design of Timber Structures, Part 1-1, General Rules for Buildings				
Knowledge evaluation	Assignment (main and working design for a wooden structure)Written part of examination: solving problems (practical part) and answering questions (theoretical part)Oral examination: candidates may take the oral exam only after having passed the written examination.				
Remark	Preparation of final paper is possible.				
Prerequisites:	Students cannot enroll in this course unless they have passed Descriptive Geometry in Civil Engineering I Students cannot enroll in this course unless they have passed Structural Design Students cannot enroll in this course unless they have completed Construction Materials Students cannot enroll in this course unless they have passed Mathematics I				
Proposal made by	(15.10.2007)				