

Semester 1		
Undergraduate professional study in civil engineering obligatory courses		
P: Zoran Veršić P: Sanja Lađarević dipl.ing.arh. P: Iva Ževrnja predavač A: Iva Ževrnja predavač K: Iva Ževrnja predavač A: Goran Babić K: Goran Babić A: Bernarda Cesar K: Bernarda Cesar	Building elements I	ECTS:7.0
P:mr.sc. Donka Wurth v. predavač P: Tomislav Svaguša A:mr.sc. Jure Galić predavač L:mr.sc. Jure Galić predavač A:mr.sc. Donka Wurth v. predavač L:mr.sc. Donka Wurth v. predavač	Construction Materials	ECTS:5.0
A: Natalija Špehar viši predavač	Kinesiology Education I	ECTS:1.0
P:dr.sc. Mandi Orlić Bachler v.pred P:mr. sc. Reni Banov dipl. ing. mat. P: Ivana Božić Dragun dipl.prof.mat. A:dr.sc. Mandi Orlić Bachler v.pred A:mr. sc. Reni Banov dipl. ing. mat. A: Ivana Božić Dragun dipl.prof.mat. A: Martina Benković	Mathematics I	ECTS:7.0
P:dr.sc. Mirela Katić Žlepalo prof.mat. P: Ivana Božić Dragun dipl.prof.mat. A:dr.sc. Mirela Katić Žlepalo prof.mat. K:dr.sc. Mirela Katić Žlepalo prof.mat. A: Ivana Božić Dragun dipl.prof.mat. K: Ivana Božić Dragun dipl.prof.mat.	Descriptive Geometry in Civil Engineering I	ECTS:3.0
P:dr.sc. Mandi Orlić Bachler v.pred P:dr.sc. Dalibor Gelo mag.ing.aedif. P:dr.sc. Igor Gukov , dipl.ing.građ. L:dr.sc. Igor Gukov , dipl.ing.građ. L: Ivan Volarić struč.spec.ing.aedif.	Computer Use in Civil Engineering	ECTS:2.0
P:mr.sc. Željko Lebo v. pred. P:dr.sc. Dalibor Gelo mag.ing.aedif. A:mr.sc. Željko Lebo v. pred. K:mr.sc. Željko Lebo v. pred. A:mr.sc. Jure Galić predavač K:mr.sc. Jure Galić predavač A:dr.sc. Dalibor Gelo mag.ing.aedif. K:dr.sc. Dalibor Gelo mag.ing.aedif.	Engineering Mechanics	ECTS:6.0

Semester 2
Undergraduate professional study in civil engineering obligatory courses

P: Sanja Lađarević dipl.ing.arh. P: Iva Ževrnja predavač A: Iva Ževrnja predavač K: Iva Ževrnja predavač A: Goran Babić K: Goran Babić A: Bernarda Cesar K: Bernarda Cesar	Building elements II	ECTS:5.0
P:prof.vis.šk. Ivica Levanat P: Alemka Knapp A: Alemka Knapp L:prof.dr. Dubravko Horvat L: Diana Šaponja-Milutinović dipl.ing.fizike, pred.	Physics	ECTS:5.0
A: Natalija Špehar viši predavač	Kinesiology Education II	ECTS:1.0
P:mr. sc. Reni Banov dipl. ing. mat. P:dr.sc. Mandi Orlić Bachler v.pred P: Ivana Božić Dragun dipl.prof.mat. A:dr.sc. Mandi Orlić Bachler v.pred A:mr. sc. Reni Banov dipl. ing. mat. A: Ivana Božić Dragun dipl.prof.mat.	Mathematics II	ECTS:6.0
P:dr.sc. Mirela Katić Žlepalo prof.mat. P: Ivana Božić Dragun dipl.prof.mat. A:dr.sc. Mirela Katić Žlepalo prof.mat. K:dr.sc. Mirela Katić Žlepalo prof.mat. A: Ivana Božić Dragun dipl.prof.mat. K: Ivana Božić Dragun dipl.prof.mat.	Descriptive Geometry in Civil Engineering II	ECTS:3.0
P:dr.sc. Tatjana Vlahović prof.v.škole A:dr.sc. Tatjana Vlahović prof.v.škole	Elementary Geology	ECTS:2.0
P:dr.sc. Krunoslav Pavković dipl.ing.građ. P:doc. dr. sc. Dean Čizmar dipl. ing. građ. A: Šime Serdarević mag. ing. aedif. L: Šime Serdarević mag. ing. aedif.	Strength of materials	ECTS:3.0
P:dr.sc. Dalibor Gelo mag.ing.aedif. P:mr.sc. Željko Lebo v. pred. A:mr.sc. Željko Lebo v. pred. K:mr.sc. Željko Lebo v. pred. A:mr.sc. Jure Galić predavač K:mr.sc. Jure Galić predavač A:dr.sc. Dalibor Gelo mag.ing.aedif. K:dr.sc. Dalibor Gelo mag.ing.aedif.	Construction calculation	ECTS:6.0

Semester 3		
Undergraduate professional study in civil engineering obligatory courses		
P:dr.sc. Igor Gukov , dipl.ing.građ. A: Dalibor Mačkić K: Dalibor Mačkić A:dr.sc. Igor Gukov , dipl.ing.građ. K:dr.sc. Igor Gukov , dipl.ing.građ.	Concrete Structures I	ECTS:5.0
P:doc. dr. sc. Dean Čizmar dipl. ing. građ. P:prof.vis.šk. Boris Baljkas A: Šime Serdarević mag. ing. aedif. K: Šime Serdarević mag. ing. aedif. A:doc. dr. sc. Dean Čizmar dipl. ing. građ. K:doc. dr. sc. Dean Čizmar dipl. ing. građ.	Wooden Structures	ECTS:5.0
P:prof. dr. sc. Đuro Barković dip. ing. geod. A:prof. dr. sc. Đuro Barković dip. ing. geod. K:prof. dr. sc. Đuro Barković dip. ing. geod.	Geodesy	ECTS:2.0
A: Natalija Špehar viši predavač	Kinesiology Education III	ECTS:1.0
P:dr.sc. Sonja Zlatović , profesor visoke škole P:mr.sc. Željko Lebo v. pred. K:dr.sc. Sonja Zlatović , profesor visoke škole L:dr.sc. Sonja Zlatović , profesor visoke škole S:dr.sc. Sonja Zlatović , profesor visoke škole K: Ivana Pavlič	Soil Mechanics	ECTS:5.0
P:dr.sc. Mladen Petričec dipl.ing.građ. P: Ivana Bartolić , pred. A: Ivana Bartolić , pred. S: Ivana Bartolić , pred. A: Filip Kalinić mag. ing. aedif. S: Filip Kalinić mag. ing. aedif.	Introduction to Hydrology and Hydraulics	ECTS:5.0
P:mr.sc. Lucija Bačić v.pred. A:mr.sc. Lucija Bačić v.pred. S:mr.sc. Lucija Bačić v.pred. A: Nataša Uzelac S: Nataša Uzelac	Sociology	ECTS:2.0
P:mr.sc. Gorana Čosić-Flajsig viši predavač A: Dejan Kovačević dipl.ing.građ. S: Dejan Kovačević dipl.ing.građ.	Environmental Protection	ECTS:2.0
Undergraduate professional study in civil engineering elective courses		
P:dr.sc. Ivana Špiranec prof. visoke škole A:dr.sc. Ivana Špiranec prof. visoke škole	English language I	ECTS:4.0
P: Doc. dr. sc. Lidija Tepeš Golubić v. pred. A: Doc. dr. sc. Lidija Tepeš Golubić v. pred.	German Language I	ECTS:4.0

Semester 4**Undergraduate professional study in civil engineering obligatory courses**

P:doc.dr.sc. Miroslav Šimun dipl.ing.građ. A: Sandra Mihalina mag.ing.aedif. K: Sandra Mihalina mag.ing.aedif. A:doc.dr.sc. Miroslav Šimun dipl.ing.građ. K:doc.dr.sc. Miroslav Šimun dipl.ing.građ.	Public Roads I	ECTS:5.0
P:mr.sc. Željko Lebo v. pred. P:dr.sc. Sonja Zlatović , profesor visoke škole A: Ivana Pavlič K: Ivana Pavlič S: Ivana Pavlič	Geotechnical Engineering	ECTS:5.0
P:v.predavač Boris Uremović dipl.ing.građ. P:mr.sc. Petar Adamović prof.v.škole A:v.predavač Boris Uremović dipl.ing.građ. A: Domagoj Šojat struč.spec.ing.aedif. A: Sanela Vojnović mag.ing.aedif	Construction Machinery	ECTS:4.0
A: Natalija Špehar viši predavač	Kinesiology Education IV	ECTS:1.0
P:dr.sc. Krunoslav Pavković dipl.ing.građ. P:prof.vis.šk. Boris Baljkas A:dr.sc. Krunoslav Pavković dipl.ing.građ. K:dr.sc. Krunoslav Pavković dipl.ing.građ. A: Šime Serdarević mag. ing. aedif. K: Šime Serdarević mag. ing. aedif.	Steel Structures	ECTS:5.0
A: Domagoj Šojat struč.spec.ing.aedif. A: Zdravko Muratti A: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif A:v.predavač Boris Uremović dipl.ing.građ.	Field Practice	ECTS:2.0
P:dr.sc. Mladen Petrić dipl.ing.građ. P:mr.sc. Gorana Čosić-Flajsig viši predavač A: Dejan Kovačević dipl.ing.građ. A: Filip Kalinić mag. ing. aedif.	Introduction to Hydraulic Structures	ECTS:2.0
Undergraduate professional study in civil engineering elective courses		
P:mr.sc. Časlav Dunović , viši predavač A:mr.sc. Časlav Dunović , viši predavač S:mr.sc. Časlav Dunović , viši predavač S: Brigitta Cafuta	Market and Business Environment	ECTS:5.0
Undergraduate professional study in civil engineering elective courses		
P:dr.sc. Mladen Petrić dipl.ing.građ. P: Ivana Bartolić , pred. A: Ivana Bartolić , pred. K: Ivana Bartolić , pred. S: Ivana Bartolić , pred. A: Filip Kalinić mag. ing. aedif. K: Filip Kalinić mag. ing. aedif. S: Filip Kalinić mag. ing. aedif.	Hydrology and Hydraulics	ECTS:5.0
Undergraduate professional study in civil engineering elective courses		
P:dr.sc. Mladen Petrić dipl.ing.građ. P: Ivana Bartolić , pred. A: Ivana Bartolić , pred. K: Ivana Bartolić , pred.	Hydrology and Hydraulics	ECTS:5.0

S: Ivana Bartolić , pred. A: Filip Kalinić mag. ing. aedif. K: Filip Kalinić mag. ing. aedif. S: Filip Kalinić mag. ing. aedif.		
Undergraduate professional study in civil engineering elective courses		
P:dr.sc. Igor Gukov , dipl.ing.građ. A:dr.sc. Igor Gukov , dipl.ing.građ. L:dr.sc. Igor Gukov , dipl.ing.građ. A: Ivan Volarić struč.spec.ing.aedif. L: Ivan Volarić struč.spec.ing.aedif.	Concrete Structures II	ECTS:5.0
Undergraduate professional study in civil engineering elective courses		
P:dr.sc. Ivana Špiranec prof. visoke škole A:dr.sc. Ivana Špiranec prof. visoke škole	English Language II	ECTS:2.0
P: Doc. dr. sc. Lidija Tepeš Golubić v. pred. A: Doc. dr. sc. Lidija Tepeš Golubić v. pred.	German Language II	ECTS:2.0

Semester 5		
Building Construction obligatory courses		
P:dr.sc. Dražen Arbutina dipl.ing.arh. P: Ivan Cetinić dipl.ing.str. P: Tihomir Rengel A: Ivan Cetinić dipl.ing.str. A: Tihomir Rengel	Building Installations I	ECTS:4.0
P:mr.sc. Jure Galić predavač P:dr.sc. Krunoslav Pavković dipl.ing.građ. A:dr.sc. Krunoslav Pavković dipl.ing.građ. A: Šime Serdarević mag. ing. aedif.	Prefabricated Structures	ECTS:5.0
P:v.predavač Boris Uremović dipl.ing.građ. P:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Management I	ECTS:5.0
P:mr.sc. Ante Goran Bajić viši predavač	Introduction to Railways	ECTS:2.0
P:v.predavač Boris Uremović dipl.ing.građ. A:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ K:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ A:v.predavač Boris Uremović dipl.ing.građ. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Technology	ECTS:5.0
P: Sanja Lađarević dipl.ing.arh. P:dr.sc. Dražen Arbutina dipl.ing.arh. A: Goran Babić K: Goran Babić	Finishing Works	ECTS:5.0
P: Iva Ževrnja predavač P: Jagoda Bodić dipl.ing.arh. A: Jagoda Bodić dipl.ing.arh. K: Jagoda Bodić dipl.ing.arh. A: Iva Ževrnja predavač K: Iva Ževrnja predavač	Building Engineering I	ECTS:4.0
Civil Engineering (Water and traffic infrastructure) obligatory courses		
P:doc.dr.sc. Miroslav Šimun dipl.ing.građ. A: Sandra Mihalinać mag.ing.aedif. K: Sandra Mihalinać mag.ing.aedif. A:doc.dr.sc. Miroslav Šimun dipl.ing.građ. K:doc.dr.sc. Miroslav Šimun dipl.ing.građ.	Public Roads II	ECTS:5.0
P:mr.sc. Gorana Čosić-Flajsig viši predavač P: Stjepan Kordek dipl.ing.građ. A: Dejan Kovačević dipl.ing.građ. K: Dejan Kovačević dipl.ing.građ.	Water Supply and Sewerage I	ECTS:4.0
P:v.predavač Boris Uremović dipl.ing.građ.	Construction Management I	ECTS:5.0

P:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif		
P:mr.sc. Ante Goran Bajić viši predavač	Introduction to Railways	ECTS:2.0
P:dr.sc. Mladen Petrić dipl.ing.građ. P: Ivana Bartolić , pred. A: Dejan Kovačević dipl.ing.građ. K: Dejan Kovačević dipl.ing.građ. A: Filip Kalinić mag. ing. aedif. K: Filip Kalinić mag. ing. aedif.	Regulation and Amelioration Drainage	ECTS:5.0
P:v.predavač Boris Uremović dipl.ing.građ. A:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ K:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ A:v.predavač Boris Uremović dipl.ing.građ. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Technology	ECTS:5.0
P:dr.sc. Mladen Petrić dipl.ing.građ. P: Ivana Bartolić , pred. A: Željko Pavlin dipl.ing.građ. A: Berislav Rupčić K: Berislav Rupčić	Hydraulic Structures	ECTS:4.0
Management in Civil Engineering obligatory courses		
P:mr.sc. Lucija Bačić v.pred. A:mr.sc. Lucija Bačić v.pred. S:mr.sc. Lucija Bačić v.pred. A: Nataša Uzelac S: Nataša Uzelac	Methodology and Management in Civil Engineering	ECTS:2.0
P:v.predavač Boris Uremović dipl.ing.građ. P:mr.sc. Petar Adamović prof.v.škole A:v.predavač Boris Uremović dipl.ing.građ. K:v.predavač Boris Uremović dipl.ing.građ. A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif.	Organization of Construction Site	ECTS:6.0
P:v.predavač Boris Uremović dipl.ing.građ. P:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Management I	ECTS:5.0

P:mr.sc. Ante Goran Bajić viši predavač	Introduction to Railways	ECTS:2.0
P:mr. Alenka Poljičak dipl.oec., viši predavač A:mr. Alenka Poljičak dipl.oec., viši predavač K:mr. Alenka Poljičak dipl.oec., viši predavač	Conduct of Company Business Operations	ECTS:5.0
P:mr.sc. Petar Adamović prof.v.škole P:v.predavač Boris Uremović dipl.ing.građ. A:mr.sc. Petar Adamović prof.v.škole S:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. S: Domagoj Šojat struč.spec.ing.aedif.	Project Management and Legislation	ECTS:5.0
P:v.predavač Boris Uremović dipl.ing.građ. A:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ K:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ A:v.predavač Boris Uremović dipl.ing.građ. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Technology	ECTS:5.0
Civil and Environmental Engineering obligatory courses		
P:mr.sc. Gorana Čosić-Flajsig viši predavač P: Tomislav Domanovac A: Tomislav Domanovac S: Tomislav Domanovac	Waste Management	ECTS:4.0
P:mr.sc. Gorana Čosić-Flajsig viši predavač P:dr.sc. Ivan Vučković dipl.ing.biologije L:dr.sc. Ivan Vučković dipl.ing.biologije	Water Quality	ECTS:4.0
P:mr.sc. Gorana Čosić-Flajsig viši predavač P:dr.sc. Mladen Petrićec dipl.ing.građ. A:dr.sc. Mladen Petrićec dipl.ing.građ. A: Dejan Kovačević dipl.ing.građ. K: Dejan Kovačević dipl.ing.građ.	Water Use	ECTS:5.0
P:v.predavač Boris Uremović dipl.ing.građ. P:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Management I	ECTS:5.0
P:mr.sc. Ante Goran Bajić viši predavač	Introduction to Railways	ECTS:2.0
P:v.predavač Boris Uremović dipl.ing.građ. A:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ K:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ	Construction Technology	ECTS:5.0

A:v.predavač Boris Uremović dipl.ing.građ. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif		
P:mr.sc. Gorana Čosić-Flajsig viši predavač A: Dejan Kovačević dipl.ing.građ. K: Dejan Kovačević dipl.ing.građ. L: Dejan Kovačević dipl.ing.građ. S: Dejan Kovačević dipl.ing.građ. A: Marin Ganjto	Water protection	ECTS:5.0

Semester 6		
Building Construction obligatory courses		
P:dr.sc. Dražen Arbutina dipl.ing.arh. P: Ivan Cetinić dipl.ing.str. P: Tihomir Rengel A: Tihomir Rengel K: Tihomir Rengel	Building Installations II	ECTS:4.0
P: Nina Šantek struč.spec.ing.aedif., predavač P:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Management II	ECTS:5.0
P:dr.sc. Dražen Arbutina dipl.ing.arh.	Historical Development of Civil Engineering	ECTS:2.0
P:dr.sc. Dražen Arbutina dipl.ing.arh.	Introduction to Physical Planning	ECTS:2.0
P: Iva Ževrnja predavač P: Jagoda Bodić dipl.ing.arh. A: Jagoda Bodić dipl.ing.arh. K: Jagoda Bodić dipl.ing.arh. A:dr.sc. Dražen Arbutina dipl.ing.arh. K:dr.sc. Dražen Arbutina dipl.ing.arh. A: Iva Ževrnja predavač K: Iva Ževrnja predavač	Building Engineering II	ECTS:5.0
Building Construction elective courses		
P: Jagoda Bodić dipl.ing.arh.	Final Thesis with Field Practice	ECTS:12.0
Civil Engineering (Water and traffic infrastructure) obligatory courses		
P:mr.sc. Gorana Čosić-Flajsig viši predavač A:mr.sc. Gorana Čosić-Flajsig viši predavač A: Dejan Kovačević dipl.ing.građ. K: Dejan Kovačević dipl.ing.građ. A: Marin Ganjto	Water Supply and Sewerage II	ECTS:5.0
P: Nina Šantek struč.spec.ing.aedif., predavač P:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Management II	ECTS:5.0
P:dr.sc. Dražen Arbutina dipl.ing.arh.	Introduction to Physical Planning	ECTS:2.0
P:mr.sc. Ante Goran Bajić viši predavač A:mr.sc. Ante Goran Bajić viši predavač K:mr.sc. Ante Goran Bajić viši predavač	Railways	ECTS:6.0
Civil Engineering (Water and traffic infrastructure) elective courses		
P: Jagoda Bodić dipl.ing.arh.	Final Thesis with Field Practice	ECTS:12.0

Management in Civil Engineering obligatory courses		
P:mr.sc. Časlav Dunović , viši predavač A:v.predavač Boris Uremović dipl.ing.građ. A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač K: Sanela Vojnović mag.ing.aedif	Planning Methods	ECTS:6.0
P: Nina Šantek struč.spec.ing.aedif., predavač P:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Management II	ECTS:5.0
P:dr.sc. Dražen Arbutina dipl.ing.arh.	Introduction to Physical Planning	ECTS:2.0
P:dr.sc. Dražen Arbutina dipl.ing.arh. P: Zdravko Muratti A:v.predavač Boris Uremović dipl.ing.građ. K:v.predavač Boris Uremović dipl.ing.građ. A: Zdravko Muratti K: Zdravko Muratti	Safety at Work	ECTS:5.0
Management in Civil Engineering elective courses		
Nositelj predmeta nije poznat	Final Thesis with Field Practice	ECTS:12.0
Civil and Environmental Engineering obligatory courses		
P: Nina Šantek struč.spec.ing.aedif., predavač P:mr.sc. Petar Adamović prof.v.škole A: Domagoj Šojat struč.spec.ing.aedif. K: Domagoj Šojat struč.spec.ing.aedif. A: Nina Šantek struč.spec.ing.aedif., predavač K: Nina Šantek struč.spec.ing.aedif., predavač A: Sanela Vojnović mag.ing.aedif K: Sanela Vojnović mag.ing.aedif	Construction Management II	ECTS:5.0
P: Ivana Bartolić , pred. P:dr.sc. Mladen Petrićec dipl.ing.građ. A: Dejan Kovačević dipl.ing.građ. K: Dejan Kovačević dipl.ing.građ.	Transport and Environment	ECTS:5.0
P: Ivana Bartolić , pred. P:dr.sc. Mladen Petrićec dipl.ing.građ. K:dr.sc. Darko Barbalić dipl.ing.građ. A: Ivana Bartolić , pred. K: Ivana Bartolić , pred. S: Ivana Bartolić , pred.	River Engineering	ECTS:6.0
P:dr.sc. Dražen Arbutina dipl.ing.arh.	Introduction to Physical Planning	ECTS:2.0
Civil and Environmental Engineering elective courses		
P: Jagoda Bodić dipl.ing.arh.	Final Thesis with Field Practice	ECTS:12.0

Code WEB/ISVU	23434/155931	ECTS	7.0	Academic year	2018/2019
Name	Building elements I				
Status	1st semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				45+45 (9+0+0+36) 120
Teachers	Lectures:1. Sanja Lađarević dipl.ing.arh. Lectures:2. Iva Ževrnja predavač Lectures: Zoran Veršić Auditory exercises: Goran Babić Auditory exercises: Bernarda Cesar Auditory exercises: Iva Ževrnja predavač Construction exercises: Goran Babić Construction exercises: Bernarda Cesar Construction exercises: Iva Ževrnja predavač				
Course objectives	Acquirement of basic knowledge on various building elements including materials, structures, and construction methods. Building physics.				
Learning outcomes:	1.differentiate between foundation types and insulation methods for protection against ground water and moisture. Level:6 2.make sketch drawings of load bearing, partition, and multilayer walls made of various materials. Level:6 3.draw brick joints: angle joint, butt joint, and wall intersection joint. Level:6 4.differentiate between modern and traditional form types, with their specific features. Level:6 5.connect wall openings and their realization in different wall types. Level:6,7 6.differentiate between chimney and ventilation opening types, according to material, shape, way of construction, and evacuation of combustion products. Level:6 7.draw layout plan and conceptual drawing. Level:6 8.analyze external and internal actions on building from the standpoint of energy savings, thermal protection, and noise protection. Level:6 9.define layers of engineering structures from the standpoint of energy savings, thermal protection, and noise protection. Level:6,7 10.calculate numerical values of engineering-physical properties of an external multilayer wall. Level:6				
Methods of carrying out lectures	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.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming				
How construction exercises are held	Other Elaboration of graphical (numerical) assignments with the assistance of lecturer when needed.				
Course content lectures	1.Introduction, notion of a building, structural elements of buildings , 3h, Learning outcomes:6 2FOUNDATIONS, 3h, Learning outcomes:6 3.Waterproofing as protection against ground water and moisture, 3h, Learning outcomes:6 4.Vertical structural elements presented by materials , 3h, Learning outcomes:6 5.Walls made of brick, 2h, Learning outcomes:7 Walls made of stone, 1h, Learning outcomes:7 6.Walls made of wood,, 1h, Learning outcomes:7 Walls made of concrete blocks, lightweight concrete, 2h, Learning outcomes:7 7.Traditional and modern types of formwork , 1h, Learning outcomes:7 Walls made of monolithic concrete, 1h, Learning outcomes:7 Multilayered walls , 1h, Learning outcomes:7 8.Partitions walls , 1h, Learning outcomes:7 9.Openings in walls, 2h, Learning outcomes:7 10.Ventilation ducts , 1h, Learning outcomes:7 Chimneys, 2h, Learning outcomes:7 11.Chimneys, 3h, Learning outcomes:7 12.Heat transfer., 1h, Learning outcomes:7 Thermal conductivity, 1h, Learning outcomes:7 Values of heat transfer coefficients , 1h, Learning outcomes:7 13.Water vapour condensation. , 1h, Learning outcomes:7 Thermal bridges, 1h, Learning outcomes:7 Water vapour diffusion., 1h, Learning outcomes:7 14.Temperature variations and temperature stresses , 1h, Learning outcomes:7 Properties of sound, 2h, Learning outcomes:7 15.Noise, 1h, Learning outcomes:7 Sound waves, 1h, Learning outcomes:7 Sound absorption, 1h, Learning outcomes:7 16.Transfer of airborne sound and impact sound. , 2h, Learning outcomes:7 Insulation, 1h, Learning outcomes:7				
Course content auditory	1.Design report preparation phases; content and presentation of each phase, 3h, Learning outcomes:7 2.Instructions for preparation of drawings, 1h, Learning outcomes:7 3.. 4.Instructions for preparation of drawings, 1h, Learning outcomes:7 5.. 6.Instructions for preparation of drawings, 1h, Learning outcomes:7 7..				

	8.. 9.. 10.. 11.Guidelines for solving numerical problems , 1h, Learning outcomes:7 12.Guidelines for solving numerical problems , 1h, Learning outcomes:7 13.Guidelines for solving numerical problems , 1h, Learning outcomes:7 14.. 15..										
Course content constructs	1.. 2.Individual elaboration of all design phases for a residential building, 2h, Learning outcomes:7 3.Preliminary design, detailed design , 3h, Learning outcomes:7 4.Preliminary design, detailed design , 2h, Learning outcomes:7 5.Preliminary design, detailed design , 3h, Learning outcomes:7 6.Preliminary design, detailed design , 2h, Learning outcomes:7 7.Working design (plan) of the ground floor , 3h, Learning outcomes:7 8.Working design (plan) of the ground floor , 3h, Learning outcomes:7 9.Working design (plan) of the ground floor , 3h, Learning outcomes:7 10.Working design (plan) of the ground floor , 3h, Learning outcomes:7 11.Each student is to prepare a numerical example for calculation of building physics properties of a multilayered external wall , 2h, Learning outcomes:7 12.Each student is to prepare a numerical example for calculation of building physics properties of a multilayered external wall , 2h, Learning outcomes:7 13.Each student is to prepare a numerical example for calculation of building physics properties of a multilayered external wall , 2h, Learning outcomes:7 14.Each student is to prepare a numerical example for calculation of building physics properties of a multilayered external wall , 3h, Learning outcomes:7 15.Each student is to prepare a numerical example for calculation of building physics properties of a multilayered external wall , 3h, Learning outcomes:7										
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment Elaboration of graphical (numerical) assignments with the assistance of lecturer when needed.										
Exam literature	Basic literature: 1.Sanja Ladarević: Elementi zgrada I 2. Peulić: Konstruktivni elementi zgrada I i II, Tehnička knjiga, Zagreb, 1980. 3. Z. Vrkljan, I. Kordiš: Opreme građevinskih nacrti, Fakultet građevinskih znanosti Zagreb, 1982. 4.V. Šimetin: Građevinska fizika, skripta, Građevinski institut, Zagreb, 1983. Additional literature: 1. Heinrich Schmitt: Hochbaukonstruktion 2. Martin Mittag: Građevinske konstrukcije										
Students obligations	maximum of 3 absences from exercises										
Knowledge evaluation during semester	Redovitost pohađanja, Kolokvij: teorijska pitanja, grafi zadaci, raski zadaci Programski zadatak										
Knowledge evaluation after semester	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.										
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Activity in class)</td><td>1</td></tr> <tr> <td>(Project)</td><td>2</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Activity in class)	1	(Project)	2	(Written exam)	2	(Constantly tested knowledge)	2
Aktivnost	ECTS										
(Activity in class)	1										
(Project)	2										
(Written exam)	2										
(Constantly tested knowledge)	2										
Remark	This course can be used for final thesis theme										
Prerequisites:	No prerequisites.										
ISVU equivalents:	22340;										

Code WEB/ISVU	23435/155932	ECTS	5.0	Academic year	2018/2019
Name	Building elements II				
Status	2nd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (6+0+0+24) 90
Teachers	Lectures:1. Sanja Lađarević dipl.ing.arh. Lectures:2. Iva Ževrnja predavač Auditory exercises: Goran Babić Auditory exercises: Bernarda Cesar Auditory exercises: Iva Ževrnja predavač Construction exercises: Goran Babić Construction exercises: Bernarda Cesar Construction exercises: Iva Ževrnja predavač				
Course objectives	Acquirement of basic knowledge on various building elements including materials, structures, and construction methods.				
Learning outcomes:	1.differentiate between lightweight and massive horizontal structural elements. Level:6 2.make a sketch drawing of different types of floor structures depending on the type of material and construction technology. Level:6 3.differentiate and present graphically pitched roofings from the aspect of construction method, materials and roof structures. Level:6 4.correlate specific features of flat roofs from the standpoint of their engineering-physical properties and typical details, and present them graphically. Level:6,7 5.calculate dimensions of stair elements considering the specified height and plan view of the zone, and present them graphically, both in plan and cross-section, taking into account different construction methods and structural systems. Level:6 6.make working drawing of a building. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other				
Methods of carrying out auditory exercises	Group problem solving				
How construction exercises are held	Group problem solving Discussion, brainstorming				
Course content lectures	1.Horizontal structural elements , 2h, Learning outcomes:6 2.Lightweight and massive structures, construction technology, 2h, Learning outcomes:6 3.Monolithic floors , 2h, Learning outcomes:6 4.Semi-prefabricated floors , 2h, Learning outcomes:6 5.Prefabricated floors , 2h, Learning outcomes:6 6. Roofs, 2h, Learning outcomes:6 7.Sloped roofs , 2h, Learning outcomes:6 8.Sloped roofs , 2h, Learning outcomes:6 9.Sloped roofs , 2h, Learning outcomes:6 10.Flat roofs , 2h, Learning outcomes:6 11.Flat roofs , 2h, Learning outcomes:6 12. Stairs, 2h, Learning outcomes:6 13.Stairs made of monolithic reinforced-concrete , 2h, Learning outcomes:6 14.Stairs made of prefabricated reinforced-concrete , 2h, Learning outcomes:6 15.Stairs made of wood and steel , 2h, Learning outcomes:6				
Course content auditory	1.Design report preparation phases; content and presentation of each phase., 1h, Learning outcomes:6 2.instructions for preparation of drawings , 1h, Learning outcomes:6 3., 2h 4.. 5.Instructions for preparation of drawings , 1h 6.. 7.instructions for preparation of drawings , 1h, Learning outcomes:6 8.instructions for preparation of drawings , 1h, Learning outcomes:6 9.instructions for preparation of drawings , 1h, Learning outcomes:6 10.. 11.. 12.. 13.. 14.. 15..				
Course content constructs	1.Individual elaboration of all design phases for a residential building, 1h, Learning outcomes:6 2.Working design (basement) , 1h, Learning outcomes:6 3.Working design (basement) , 2h, Learning outcomes:6 4.Working design (basement) , 2h, Learning outcomes:6 5.Working design (basement) , 2h, Learning outcomes:6 6.Working design (roof plan and roof cross-section), 1h, Learning outcomes:6				

	7.Working design (roof plan and roof cross-section), 1h, Learning outcomes:6 8.Working design (roof plan and roof cross-section), 2h, Learning outcomes:6 9.Working design (roof plan and roof cross-section), 2h, Learning outcomes:6 10.Working design (roof plan and roof cross-section), 2h, Learning outcomes:6 11.Working design (cross section), 1h, Learning outcomes:6 12.Working design (cross section), 1h, Learning outcomes:6 13.Working design (cross section), 2h, Learning outcomes:6 14.Working design (cross section), 2h, Learning outcomes:6 15.Working design (cross section), 2h, Learning outcomes:6										
Required materials	Basic: classroom, blackboard, chalk... Special purpose computer laboratory Whiteboard with markers Portable overhead projector										
Exam literature	Basic literature: 1. M.Smoljanović: Separati predavanja 2. ?. Peulić: Konstruktivni elementi zgrada I i II, Tehnička knjiga, Zagreb, 1980. 3. Z. Vrkljan, I. Kordiš: Opreme građevinskih nacrti, Fakultet građevinskih znanosti Zagreb, 1982. Additional literature: 1. Heinrich Schmitt: Hochbaukonstruktion 2. Martin Mittag: Građevinske konstrukcije										
Students obligations	maximum of 3 absences from exercises										
Knowledge evaluation during semester	Redovitost pohaa#20#0#60\$Kolokvij, teorijska pitanja#2#80#55\$Programski zadatak#3#20#100\$										
Knowledge evaluation after semester	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.										
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>1</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>2</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Project)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	1	(Constantly tested knowledge)	2	(Written exam)	1	(Project)	1
Aktivnost	ECTS										
(Classes attendance)	1										
(Constantly tested knowledge)	2										
(Written exam)	1										
(Project)	1										
Remark	This course can be used for final thesis theme										
Prerequisites:	No prerequisites.										
ISVU equivalents:	22341;										



Code WEB/ISVU	23944/184757	ECTS	4.0	Academic year	2018/2019
Name	Building Engineering I				
Status	5th semester - Building Construction (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (2+0+0+28) 60
Teachers	Lectures:1. Jagoda Bodić dipl.ing.arh. Lectures: Iva Ževrnja predavač Auditory exercises: Jagoda Bodić dipl.ing.arh. Auditory exercises: Iva Ževrnja predavač Construction exercises: Jagoda Bodić dipl.ing.arh. Construction exercises: Iva Ževrnja predavač				
Course objectives	Students will acquire practical knowledge for competent work in design offices and construction companies.				
Learning outcomes:	1.analyze functions of an apartment. Level:6 2.draw a detached family house at the detailed design and working design levels. Level:6 3.plan building position with regard to possibility of access, orientation, and construction requirements. Level:6,7 4.make drawing to connect functional groups in housing space. Level:6,7 5.propose structural system taking into account the size of the building, economic considerations, and materials. Level:6,7 6.integrate knowledge gained on building elements, building physics, finishing works, installations and structural systems during preparation of the detailed design and working design. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Discussion Questions and answers Homework presentation Other 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.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other Instructions for the preparation of the assignment and seminar paper. Analysis of exemplary student work prepared in previous years.				
How construction exercises are held	Other Independent preparation of the assignment, with corrections as necessary.				
Course content lectures	1.Introduction, problems and significance of the design of residential buildings, 2h, Learning outcomes:3 2. Architectural barriers. Technical documentation and the building law, 2h, Learning outcomes:3 3.Design elements: man as a measure of all things, 2h, Learning outcomes:1,3 4.Positioning building in the plot with regard to the sides of the world and according to construction requirements, 2h, Learning outcomes:1,3 5.Positioning building in the plot with regard to the sides of the world and according to construction requirements, 2h, Learning outcomes:1,3 6.Apartment and its functions, 2h, Learning outcomes:1,3,4 7.Communications: staircases, corridors, 2h, Learning outcomes:1,3,4 8.Solution to functional groups in an apartment: living quarters, 2h, Learning outcomes:1,3,4 9.Solution to functional groups in an apartment: sleeping quarters, sanitary rooms , 2h, Learning outcomes:1,3,4 10.Solution to functional groups in an apartment: utility area, 2h, Learning outcomes:1,3,4 11.Solution to functional groups in an apartment: utility area, 2h, Learning outcomes:1,3,4 12.Cross section, facades - examples and analyses , 2h, Learning outcomes:1,2,5,6 13.Family houses: detached houses - examples and analyses , 2h, Learning outcomes:1,3 14.Family houses: detached houses - examples and analyses , 2h, Learning outcomes:1,3 15.Family houses: detached houses - examples and analyses , 2h, Learning outcomes:1,3				
Course content auditory	1.Presentation of regulations and standards, instructions for the preparation of assignments, 2h, Learning outcomes:1,3 2.. 3.. 4.. 5.. 6.. 7.. 8.. 9.. 10.. 11.. 12.. 13.. 14.. 15..				
Course content constructs	1.. 2.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 3.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6				

	4.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 5.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 6.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 7.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 8.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 9.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 10.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 11.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 12.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 13.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 14.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6 15.Independent elaboration of the first assignment : family house detailed design and working design details, 2h, Learning outcomes:2,3,4,5,6						
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment Independent preparation of the assignment, with corrections as necessary.						
Exam literature	1.J. Bodić : Separati predavanja 2. J. Bodić, I. Ževrnja: Zgradarstvo I priručnik za izvođenje konstrukcijskih vježbi; izbor studentskih radova iz programa samostojećih obiteljskih zgrada 3. Lj. Biondić: Uvod u projektiranje stambenih zgrada, Golden marketing - Tehnička knjiga, Zagreb, 2011 4.G. Knežević, I. Kordiš: Stambene i javne zgrade (V izdanje), Tehnička knjiga , Zagreb 1981 5.G. Knežević: Višestambene zgrade, Tehnička knjiga, Zagreb 1986 6.E.Neufert: Elementi arhitektonskog projektiranja, Golden marketing, Zagreb 2002 7.A.Štulhofer, Z.Veršić: Crtanje arhitektonskih nacrti, Pribor i osnove, UPI-2m,Zagreb1998 8.Zakon o prostornom uređenju i gradnji 153/13 9.Pravilnik o pristupačnosti građevine osobama s invaliditetom i smanjene pokretljivosti, NN 78/2013 10. Oris, časopis za arhitekturu i kulturu						
Students obligations	.						
Knowledge evaluation during semester	.						
Knowledge evaluation after semester	.						
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Project)</td><td>3</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Project)	3	(Written exam)	1
Aktivnost	ECTS						
(Project)	3						
(Written exam)	1						
Remark	This course can be used for final thesis theme						
Prerequisites:	Students cannot enroll in this course unless they have passed Građevinski materijali Students cannot enroll in this course unless they have passed Betonske konstrukcije II						
ISVU equivalents:	22383;155984;						



Code WEB/ISVU	23948/184761	ECTS	5.0	Academic year	2018/2019
Name	Building Engineering II				
Status	6th semester - Building Construction (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (2+0+0+28) 90
Teachers	Lectures:1. Jagoda Bodić dipl.ing.arh. Lectures: Iva Ževrnja predavač Auditory exercises:dr.sc. Dražen Arbutina dipl.ing.arh. Auditory exercises: Jagoda Bodić dipl.ing.arh. Auditory exercises: Iva Ževrnja predavač Construction exercises:dr.sc. Dražen Arbutina dipl.ing.arh. Construction exercises: Jagoda Bodić dipl.ing.arh. Construction exercises: Iva Ževrnja predavač				
Course objectives	Students will acquire practical knowledge for competent work in design offices and construction companies.				
Learning outcomes:	1.analyze functions of an apartment. Level:6 2.classify apartments according to the distribution of basic habitation units. Level:6,7 3.draw the structure of apartments (plan views) in a multi-family building at the preliminary design level, based on the selection of communications (means of access). Level:6 4.planirati položaj zgrade obzirom uvjete građenja . Level:6,7 5.draw functional living groups in multi-family buildings. Level:6,7 6.propose structural system based on the size of the building, economic considerations, and materials. Level:6,7 7.integrate knowledge gained on building elements, building physics, finishing works, installations and structural systems during preparation of the detailed design and working design. Level:6,7 8.presentation of seminar. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Discussion Questions and answers Homework presentation Other Theoretical lectures, video presentations, drawing on the board. Students have to follow lectures by drawings, to develop, improve, graphical expression.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other				
How construction exercises are held	Other				
Course content lectures	1.Family residential buildings: semi-detached building - examples and analysis, 2h, Learning outcomes:1,2,4 2.Family residential buildings: housing series - examples and analysis, 2h, Learning outcomes:1,2,4 3.Apartment building: typology of buildings, contents and structure, 2h, Learning outcomes:1,2,4 4.Apartment building: typology of buildings, communication, 2h, Learning outcomes:1,2,4 5.Apartment building: common areas in buildings, 2h, Learning outcomes:1,2,4,6,7 6.Apartment building: spacious apartment program, 2h, Learning outcomes:1,2,4 7.Apartment building: analysis of the structure of apartments and examples, 2h, Learning outcomes:1,2,4 8.Apartment building: analysis of the structure of apartments and examples, 2h, Learning outcomes:1,2,4 9.Apartment building: analysis of structures floors and examples, 2h, Learning outcomes:1,2,4 10.Apartment building: analysis of structures floors and examples, 2h, Learning outcomes:1,2 11.Apartment building: the gallery system, 2h, Learning outcomes:1,2,4 12..Apartment building: residential towers, 2h, Learning outcomes:1,2,4 13.Apartment building: examples of completed structures, 2h, Learning outcomes:1,2,4 14.Apartment building: examples of completed structures, 2h, Learning outcomes:1,2,4 15.Apartment building: examples of completed structures, 2h, Learning outcomes:1,2,4				
Course content auditory	1.Instructions for the preparation of assignments and analysis of former student assignments, 2h, Learning outcomes:1,4 2.. 3.. 4.. 5.. 6.. 7.. 8.. 9.. 10.. 11.. 12.. 13.. 14.. 15..				
Course content constructs	1.. 2.nIndependent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 3.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h,				

	Learning outcomes:1,2,4,6,7 4.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 5.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 6.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 7.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 8.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 9.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 10.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 11.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 12.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 13.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 14.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6,7 15.Independent elaboration of the second assignment, with corrections: residential building - preliminary design, 2h, Learning outcomes:1,2,4,6	
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Portable overhead projector	
Exam literature	1.J. Bodić : Separati predavanja arhitekture 20 stoljeća 2. J. Bodić, I. Ževrnja: Zgradarstvo I, priručnik za izvođenje konstrukcijskih vježbi; izbor studentskih radova iz programa samostojećih obiteljskih zgrada 3. Lj. Biondić: Uvod u projektiranje stambenih zgrada, Golden marketing - Tehnička knjiga, Zagreb, 2011 4.G. Knežević, I. Kordiš: Stambene i javne zgrade (V izdanje), Tehnička knjiga , Zagreb 1981 5.G. Knežević: Višestambene zgrade, Tehnička knjiga, Zagreb 1986 6.E.Neufert: Elementi arhitektonskog projektiranja, Golden marketing, Zagreb 2002 7.A.Štulhofer, Z.Veršić: Crtanje arhitektonskih nacrt, Pribor i osnove, UPI-2m,Zagreb1998 8.Zakon o prostornom uređenju i gradnji, 153/13 9.Pravilnik o pristupačnosti građevine osobama s invaliditetom i smanjene pokretljivosti, NN 78/2013 10.Oris, časopis za arhitekturu i kulturu	
Students obligations	.	
Knowledge evaluation during semester	.	
Knowledge evaluation after semester	.	
Student activities:	Aktivnost (Project) (Written exam)	ECTS 3 2
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have completed Zgradarstvo I Students cannot pass this course unless they have passed Zgradarstvo I	
ISVU equivalents:	22384;147443;155985;	
Proposal made by	.	

Code WEB/ISVU	23942/184755	ECTS	4.0	Academic year	2018/2019
Name	Building Installations I				
Status	5th semester - Building Construction (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+15 (5+0+0+10) 75
Teachers	Lectures:1. Ivan Cetinić dipl.ing.str. Lectures:2. Tihomir Rengel Lectures:dr.sc. Dražen Arbutina dipl.ing.arh. Auditory exercises: Ivan Cetinić dipl.ing.str. Auditory exercises: Tihomir Rengel				
Course objectives	Study of water supply and drainage installations, fire installations, and gas installations in buildings from the aspect of their function/use, position within the building, space required, and compatibility with modern solutions and building technologies. Study of thermo-technical installations (heating, cooling, ventilation, and air conditioning), gas installations, electrical installations (lighting, electromechanical devices, lightning installations, telephone installations, aerial systems) and vertical-transport installations in buildings, from the aspect of their function, position within the building, space required, and compatibility with modern solutions and building technologies.				
Learning outcomes:	1.analyze types of waste water, types of water supply systems, and gas requirements. Level:6 2.define conditions for connecting individual buildings to municipal services (water supply, drainage and gas). Level:6 3.classify building according to prevailing regulations from the aspect of safety of use, and fire protection system selection. Level:6,7 4.calculate quantities of waste water, drinking water, fire protection water, and gas, and network dimensioning with respect to individual services. Level:6 5.solve evacuation of smoke from adopted gas devices, and calculate and design the chimney. Level:6 6.draw adopted solutions for water supply, drainage, and gas services in construction drawings. Level:6 7.estimate significance and value of individual services with respect to other architectural-structural elements of the building. Level:6,7 8.organise participants in the installation of individual services during construction of multistorey residential or public buildings. Level:6,7 9.manage installation of water supply and drainage services in multistorey residential or public buildings. Level:6,7				
Methods of carrying out lectures	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.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming				
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 content lectures	1.Supply and possible sources of sanitary drinking water. Consumption estimate , 2h, Learning outcomes:1,2,3 2.Water supply diagrams; function, materials and realization of individual elements and assemblies; water consumption measurement, 2h, Learning outcomes:2,4,6 3.Individual and central systems for hot water generation; types of power sources; solar energy in hot water preparation , 2h, Learning outcomes:3,4,7,8 4.Basic diagrams, size of device and its elements; space for building installations; installation of various sun collector types, 2h, Learning outcomes:1,2 5.Hot water generation design; dimensioning the water supply piping network; selection and types of pressure boosting systems, 2h, Learning outcomes:1,3,6,8 6.Water based fire protection systems for buildings; basic principles, function, materials and realization of individual elements and assemblies, 2h, Learning outcomes:2,5,8,9 7Automatic fire protection systems based on gas FM 200; fire detection systems; anti-burglary and monitoring systems, 2h, Learning outcomes:3,6,8 8.Relevant legislation; external and internal hydrant networks; automatic sprinkler systems; fire fighting by gas and foam, 2h, Learning outcomes:1,4,5,7,8 9. Types of sewage and sewerage systems; typical diagram presentations; function, materials and realization of individual elements and assemblies, 2h, Learning outcomes:1,5,6,7 10.Sanitarni predmeti i ure: ergonomski uporabni prostori; prefabricirani elementi; sanitarne blok stjene i kabine., 2h, Learning outcomes:4,5,8,9 11.Vrste ure za proanje otpadnih voda; odvajamasti, ulja i benzina; sabirne i septi jame; biodisk., 2h, Learning outcomes:2,3,6 12.Sewerage piping design; equivalent factor method (DIN 1986); calculation method according to K2h, Learning outcomes:3,4,6,7 13. Gas types and uses; gas installation diagram; function, materials and realization of individual elements and assemblies, 2h, Learning outcomes:3,6,7,9 14.Types of energy-using devices, installation requirements; types and dimensioning of gas chimneys , 2h, Learning outcomes:2,4,6,9 15.Relevant legislation. Dimensioning of gas installations, 2h, Learning outcomes:2,4,6,7,8				

Course content auditory	1.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 2.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 3.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 4.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 5.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 6.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 7.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 8.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 9.no clas, Learning outcomes:1,2,3,4,5 10.no clas, Learning outcomes:1,2,3,4,5 11.no clas, Learning outcomes:1,2,3,4,5 12.no clas, Learning outcomes:1,2,3,4,5 13.no clas, Learning outcomes:1,2,3,4,5 14.no clas, Learning outcomes:1,2,3,4,5 15.no clas, Learning outcomes:1,2,3,4,5
Course content constructures	1.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5,6 2.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,4,5 3.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 4.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 5.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 6.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 7.Presentation of solutions to installations problems based on a concrete example from civil engineering practice., 1h, Learning outcomes:1,2,3,4,5 8.no clas 9.no clas 10.no clas 11.no clas 12.no clas 13.no clas 14.no clas 15.no clas
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment
Exam literature	Basic literature: 1. Cetinić,I.:Vodovod, radni materijal- Skripte predavanja i vježbe 2. Cetinić,I.:Kanalizacija, radni materijal- Skripte predavanja i vježbe 3. Cetinić,I.:Plinske instalacije, radni materijal- Skripte predavanja i vježbe 4. Cetinić,I.:Grijanje, radni materijal- Predavanja 5. Cetinić,I.:Hlađenje, ventilacija i klimatizacija, radni materijal- Skripte predavanja i vježbe 6. Cetinić,I.:Električne instalacije, radni materijal- Skripte predavanja i vježbe 7. Cetinić,I.:Instalacije grijanja i elektrike, radni materijal- Skripte vježbe Additional literature: 1. Radonjić, M.: Vodovod i kanalizacija u zgradama, Croatiaknjiga, 2004. 2. Tušar, B.: Kućna kanalizacija, Građevinski fakultet, 2001. 3. Tušar, B.: Ispuštanje i pročišćavanje otpadne vode, Croatiaknjiga, 2004. 4. Tadić,D.: Kućne instalacije, BGZ, Beograd, 1963. 5. Strelec i suradnici: Plinarski priručnik, Energetika marketing, Zagreb , 2001 6. Recknagel;Sprengel;Schramek: Priručnik za grijanje, hlađenje, ventilaciju i klimatizaciju, V.Banja, 2002. 7. Labudović i suradnici: Priručnik za ventilaciju i klimatizaciju,Energetika marketing, Zagreb , 2000. 8. Podlipnik,B : Svjetlotehnički priručnik, Elektrokovina, Maribor, 1978.
Students obligations	maximum of 3 absences from exercises
Knowledge evaluation during semester	Redovitost pohaa#10#0#50\$Kolokvij, numeri zadaci#1#50#60\$Kolokvij, teorijska pitanja#1#50#60\$
Knowledge evaluation after semester	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.



Student activities:	Aktivnost	ECTS
	(Classes attendance)	1
	(Written exam)	2
	(Oral exam)	1
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have passed Građevinski materijali	
	Students cannot enroll in this course unless they have completed Betonske konstrukcije II	
ISVU equivalents:	22385;155937;	
Proposal made by	v.predavač Ivan Cetinić, 18.6.2012	

Code WEB/ISVU	23946/184759	ECTS	4.0	Academic year	2018/2019
Name	Building Installations II				
Status	6th semester - Building Construction (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+15 (5+0+0+10) 75
Teachers	Lectures:1. Ivan Cetinić dipl.ing.str. Lectures:2. Tihomir Rengel Lectures:dr.sc. Dražen Arbutina dipl.ing.arh. Auditory exercises: Tihomir Rengel Construction exercises: Tihomir Rengel				
Course objectives	Study of thermo-technical installations (heating, cooling, ventilation, and air conditioning), electrical installations (lighting, electromechanical devices, lightning installations, telephone installations, aerial systems) and vertical-transport installations in buildings, from the aspect of their function, position within the building, space required, and compatibility with modern solutions and building technologies.				
Learning outcomes:	1.define microclimatic conditions and hygienic bases of the area depending on the buildings location and occupancy. Level:6 2.use approximation methods to estimate losses and inflows of heat as needed to design power facilities of a building. Level:6,7 3.analyse application of a heating, cooling, ventilation or air conditioning system as related to the buildings energy requirement and sustainable construction. Level:6 4.make distinction between heating bodies based on material used, geometrical properties, and place of installation. Level:6 5.compare different sources of thermal and cooling energy depending on the primary energy consumption. Level:6,7 6.propose an optimum source of energy from the standpoint of environmental protection. Level:6,7 7.comment on solutions adopted for weak and heavy electricity installations in a building. Level:6 8.plan installation of a spare electric generator in a building depending on the type of installations and building occupancy. Level:6,7 9.insert heating, cooling, ventilation, air conditioning, and electricity solutions in plans and schematic diagrams of a building. Level:6 10.define lighting for a building depending on the occupancy of individual rooms and the type of lighting fixtures. Level:6 11.plan the type and number of elevators in a building depending on its occupancy and size. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Discussion, brainstorming Computer simulations Interactive problem solving				
How construction exercises are held	Group problem solving Workshop				
Course content lectures	1.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11 2.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:1,2 3.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:3,4 4.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:5,6 5.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:7,8 6.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:9,10 7.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:11 8.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:1,2 9.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:3,4 10.Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:5,6				

	11. Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:7,8 12. Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:9,10 13. Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:11 14. Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:1,2,3,4 15. Thermo-technical, gas and electricity installations are explained orally and through multimedia, with abundant use of drawings and slides showing installations and installation assemblies on structures/buildings, from design to realization., 2h, Learning outcomes:5,6,7,8,9,10
Course content auditory	1. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3,4 2. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,4 3. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3,4 4. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3,4 5. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3,4 6. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3,4 7. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3,4 8. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3,4 9. no class 10. no class 11. no class 12. no class 13. no class 14. no class 15. no class
Course content constructures	1. no class, Learning outcomes:1,2,3 2. no class, Learning outcomes:4,5,6 3. no class, Learning outcomes:7,8,9 4. no class, Learning outcomes:10 5. no class, Learning outcomes:1,2,3 6. no class, Learning outcomes:4,5,6 7. no class, Learning outcomes:7,8,9 8. no class, Learning outcomes:10,11 9. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3 10. The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating

	system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:4,5,6 11.The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:7,8,9 12.The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:10,11 13.The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:1,2,3 14.The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:4,5,6 15.The program assignment is realized on existing documents for a multistorey building with more than six housing units. Heating, ventilation, gas and electricity installations are solved. The selection and dimensioning of the heating system, ventilation, gas and lighting; presentation of installations in form of plan views and diagrams. Students are required to defend/justify their concepts relating to heating and electricity installations. The solution adopted has to be justified when the program assignment is submitted to the lecturer., 1h, Learning outcomes:7,8,9	
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment	
Exam literature	Cetinić,I:Grijanje, radni materijal-Predavanja Cetinić,I:Hlađenje, ventilacija i klimatizacija, radni materijal- Skripte predavanja i vježbe Cetinić,I:Električne instalacije, radni materijal- Skripte predavanja i vježbe Cetinić,I:Instalacije grijanja i elektrike, radni materijal- Skripte vježbe	
Students obligations	maximum of 3 absences from exercises	
Knowledge evaluation during semester	Redovitost pohaa#10#0#50\$Kolokvij, numeri zadaci#1#50#50\$Kolokvij, teorijska pitanja#1#50#50\$Programski zadatak#1#0#100\$	
Knowledge evaluation after semester	Written exam#1#50#50\$Oral exam#1#50#50\$	
Student activities:	Aktivnost (Classes attendance) (Written exam) (Oral exam)	ECTS 1 2 1
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot pass this course unless they have passed Instalacije zgrada I Students cannot enroll in this course unless they have completed Instalacije zgrada I	
ISVU equivalents:	39177;155938;	
Proposal made by	v.predavač Ivan Cetinić, 18.6.2012	

Code WEB/ISVU	23348/147425	ECTS	2.0	Academic year	2018/2019
Name	Computer Use in Civil Engineering				
Status	1st semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (0+15+0+0) 30
Teachers	Lectures:2. dr.sc. Igor Gukov , dipl.ing.građ. Lectures:dr.sc. Dalibor Gelo mag.ing.aedif. Lectures:dr.sc. Mandi Orlić Bachler v.pred Laboratory exercises:dr.sc. Igor Gukov , dipl.ing.građ. Laboratory exercises: Ivan Volarić struč.spec.ing.aedif.				
Course objectives	Acquiring of theoretical and practical knowledge and skills on the application of computers and application software in civil engineering and architecture.				
Learning outcomes:	1.To determine the possibility of application programming languages to solve various problems in civil engineering, architecture and mathematics. Level:7 2.Develop skills technical and information communication and use of technical information and documentation. Level:6,7 3.Make technical drawings using CAD software. Level:6 4.Calculate the value of simple mathematical expressions. Level:6 5.Solve systems of equations. Level:6 6.Solve the matrix calculus. Level:6 7.Draw a graph of real functions of one variable defined on the segment. Level:6 8.Calculate derivatives and integrate real functions of a real variable. Level:6 9.Solve equations with one unknown, ordinary differential equations and certain integrals corresponding numerical methods. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Demonstration Simulations				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Computer simulations				
Course content lectures	1.Introduction to computers, 1h, Learning outcomes:1,2 2.Basics of operating systems. Ubuntu and OpenOffice, 1h, Learning outcomes:1,2 3.Application of computers in civil engineering and architecture, 1h, Learning outcomes:1,2 4.CAD programs. BIM and REVIT, 1h, Learning outcomes:1,2 5.GIS in civil engineering, 1h, Learning outcomes:1,2 6.Programming and programming languages. Web programming, 1h, Learning outcomes:1,2 7.Introduction to Python, 1h, Learning outcomes:1,2 8.Database and SQL, 1h, Learning outcomes:1,2 9.Fundamentals of computer graphics: 3D computer graphics, 1h, Learning outcomes:1,2 10.Fundamentals of computer graphics: Modeling and animation , 1h, Learning outcomes:1,2 11.Raster and vector graphics. Vectorization of raster files, 1h, Learning outcomes:1,2 12.Artificial intelligence , 1h, Learning outcomes:1,2 13.Application of computers in mathematics, 1h, Learning outcomes:1,2 14.Specialized educational computer programs, 1h, Learning outcomes:1 15.Introduction to Maxima, 1h, Learning outcomes:1				
Course content laboratory	1.AutoCad: Drawing Tools and Editing, 1h, Learning outcomes:3 2.AutoCad: Dimensioning and hatching, 1h, Learning outcomes:3 3.AutoCad: Working with blocks and attributes, 1h, Learning outcomes:3 4.AutoCad: Working with layers. Print drawing, 1h, Learning outcomes:3 5.AutoCad: Drawing in plane, 1h, Learning outcomes:3 6.AutoCad: Drawing in space, 1h, Learning outcomes:3 7.AutoCAD: Creating views, section, volume, 1h, Learning outcomes:3 8.The first colloquium (AutoCad), 1h, Learning outcomes:1,2,3 9.Maxima: Special characters, lists, arithmetic operations, functions, 1h, Learning outcomes:4 10.Maxima and Excel: Equations with one unknown, systems of equations, 1h, Learning outcomes:5 11.Maxima and Excel: Matrix calculation, 1h, Learning outcomes:6 12.Maxima and Excel: Graphic functions, 1h, Learning outcomes:7 13.Maxima: Differential and integral calculus, 1h, Learning outcomes:8 14.Maxima and Excel:: Numerical methods - Numerical integration, Euler method, Newton method, 1h, Learning outcomes:9 15.The second colloquium (Maxima and Excel), 1h, Learning outcomes:4,5,6,7,8,9				
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory				
Exam literature	Obavezna: 1. G. Omura: Uvod u AutoCAD 2010 i AutoCAD LT 2010, Zagreb, 2009. Additional literature: 1. B. Burchard, D. Pitzer AutoCAD 2002: napredne tehnike, Zagreb, 2003. 2. E. Finkelstein: AutoCAD 2012 and AutoCAD LT 2012 Bible, 2012.				

	3. D. Abbott: AutoCAD, Zagreb, 2007. 4. Maxima: http://maxima.sourceforge.net/ 5. B. Kovačić: Matematički alati u elektrotehnici, udžbenik, Tehničko veleučilište u Zagrebu, Zagreb, 2013. 6. S. Suljagić: Matematika II, skripta, 2006. http://nastava.tvz.hr/ssuljagic/ 7. J. Liberty: Programiranje Visual Basic 2005, Zagreb, 2006. 8. Y. Fain: Programiranje Java, Zagreb, 2011. 9. I. Griffiths, M. Adams, J. Liberty: Programiranje C 4.0, Zagreb, 2011.
Students obligations	It is required to achieve at least 30 points during the semester.
Knowledge evaluation during semester	During the semester it is possible to achieve a maximum of 60 points, as follows: - two tests (each is valid 15 points): 30 points, - course completed: 30 points. By achieving at least 16 points (8 points from each test), a student is qualified for the oral exam, which is obligatory.
Knowledge evaluation after semester	At the exam it is possible to achieve a maximum of 40 points. On examination it is possible to achieve a maximum of 40 points. The exam consists of written (for students with less than 53% of points achieved through tests) and an oral part.
Student activities:	Aktivnost (Constantly tested knowledge)
	ECTS 2
Remark	This course can not be used for final thesis theme
Prerequisites:	No prerequisites.
Proposal made by	Mandi Orlić Bachler, Igor Gukov, 14.6.2017.



Code WEB/ISVU	23429/155926	ECTS	5.0	Academic year	2018/2019
Name	Concrete Structures I				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+0+20) 90
Teachers	Lectures:1. dr.sc. Igor Gukov , dipl.ing.grad. Auditory exercises:dr.sc. Igor Gukov , dipl.ing.grad. Auditory exercises: Dalibor Mačkić Construction exercises:dr.sc. Igor Gukov , dipl.ing.grad. Construction exercises: Dalibor Mačkić				
Course objectives	Students acquire appropriate theoretical and practical knowledge for the analysis and design of concrete structures.				
Learning outcomes:	1.calculate basic forces acting on concrete structure. Level:6 2.calculate a simpler design model for a concrete structure. Level:6 3.check load-bearing capacity of an element according to the limit state method. Level:6 4.sketch reinforcement details for a concrete structure. Level:6 5.draw bending schedules for beams, slabs, walls and columns. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Simulations Modelling 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.				
Methods of carrying out auditory exercises	Laboratory exercises, computer simulations Traditional literature analysis Data mining and knowledge discovery on the Web Computer simulations 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	Laboratory exercises, computer simulations Traditional literature analysis Data mining and knowledge discovery on the Web Computer simulations Students prepare programs and are assisted in this task by the lecturer.				
Course content lectures	1.General of concrete structures. Basic concepts of reinforced concrete. Advantages and disadvantages of reinforced concrete., 2h, Learning outcomes:2 2.Physical and mechanical properties of concrete and reinforcing steel. Strength and type of concrete and rebar., 2h, Learning outcomes:2 3.Terms joint work of concrete and rebar. Anchoring, and shape of reinforcement. The protective layers. The budget ranges., 2h, Learning outcomes:2 4.Action on the structure., 2h, Learning outcomes:1 5.Basic assumptions of the budget. Dimensioning of reinforced concrete structures to limit state design. Safety factors. Numerical values of action., 2h, Learning outcomes:3,4 6.Budget elements subjected to bending moment. The minimum and maximum size of the valve., 2h, Learning outcomes:2,3,4 7.Doubly reinforced rectangular cross-section. Budget T- beam shaped cross section., 2h, Learning outcomes:3,4,5 8.Elements subjected longitudinal force. Centric subjected elements. Subjected to centric tensile elements. The minimum surface reinforcement pillar., 2h, Learning outcomes:3,4 9.Plates bearing in one and two directions , opening plate. Slender elements subjected to eccentric compressive force. The first colloquium., 2h, Learning outcomes:3,4 10.Sizing section of the eccentric pressure and traction. Sizing rectangular section using interaction diagrams., 2h, Learning outcomes:3,4 11.Sizing elements subjected to transverse forces., 2h, Learning outcomes:3,4,5 12.Sizing elements subjected to torque. The second colloquium., 2h, Learning outcomes:3,4,5 13.Budget panel punching. Local compressive stresses., 2h, Learning outcomes:3,4 14.Limit states., 2h, Learning outcomes:3 15.Recap material. The third colloquium., 2h, Learning outcomes:3				
Course content auditory	1.Technical description, drawings formwork and plan position. , 1h, Learning outcomes:1 2.Calculation slab positions 201-201. Analysis of the load. , 1h, Learning outcomes:1 3.Structural analysis slab positions 201-201. , 1h, Learning outcomes:4 4.Dimensioning of slab positions 201-201. , 1h, Learning outcomes:4 5.Slab reinforcement drawing for positions 201-201. , 1h, Learning outcomes:4,5 6.Analysis of the load beam positions 202-202. , 1h, Learning outcomes:1 7.Structural analysis beam positions 202-202. , 1h, Learning outcomes:2 8.Calculation longitudinal reinforcement beams positions 202-202. , 1h, Learning outcomes:3,4 9.Calculation transverse reinforcement positions 202-202. , 1h, Learning outcomes:3,4 10.Analysis of load and structural analysis for beam position 203., 1h, Learning outcomes:1,2 11.Calculation longitudinal and transverse reinforcement for beam position 203., 1h, Learning outcomes:3,4 12.Beam reinforcement drawing for position 203., 1h, Learning outcomes:4,5 13.Calculation, load analysis, structural analysis and dimensioning of column. , 1h, Learning outcomes:1,3 14.Column reinforcement drawing., 1h, Learning outcomes:4,5 15.View and delivery of the overall program., 1h, Learning outcomes:5				
Course content constructs	1.Technical description, drawings formwork and plan position. , 1h, Learning outcomes:1 2.Calculation slab positions 201-201. Analysis of the load. , 1h, Learning outcomes:1				

	3.Structural analysis slab positions 201-201. , 1h, Learning outcomes:4 4.Dimensioning of slab positions 201-201. , 1h, Learning outcomes:4 5.Slab reinforcement drawing for positions 201-201. , 1h, Learning outcomes:4,5 6.Analysis of the load beam positions 202-202. , 1h, Learning outcomes:1 7.Structural analysis beam positions 202-202. , 1h, Learning outcomes:2 8.Calculation longitudinal reinforcement beams positions 202-202. , 1h, Learning outcomes:3,4 9.Calculation transverse reinforcement positions 202-202. , 1h, Learning outcomes:3,4 10.Analysis of load and structural analysis for beam position 203., 1h, Learning outcomes:1,2 11.Calculation longitudinal and transverse reinforcement for beam position 203., 1h, Learning outcomes:3,4 12.Beam reinforcement drawing for position 203., 1h, Learning outcomes:4,5 13.Calculation, load analysis, structural analysis and dimensioning of column. , 1h, Learning outcomes:1,3 14.Column reinforcement drawing., 1h, Learning outcomes:4,5 15.View and delivery of the overall program., 1h, Learning outcomes:5										
Required materials	Basic: classroom, blackboard, chalk... Overhead projector										
Exam literature	Osnovna: 1. Gukov, I.: Betonske konstrukcije I. Skripta Tehničkog veleučilišta u Zagrebu. Zagreb. 2010. 2. Sorić, Z., Kišiček, T.: Betonske konstrukcije 1. Sveučilišta u Zagrebu. Građevinski fakultet. Zagreb. 2014. 3. Radić, J. i suradnici: Betonske Konstrukcije Priručnik, Hrvatska sveučilišna naklada, Sveučilište u Zagrebu, Građevinski fakultet, SECON HNDK, Andris, Zagreb, 2006. 4. Radić, J. i suradnici: Betonske Konstrukcije Riješeni primjeri, Hrvatska sveučilišna naklada, Sveučilište u Zagrebu, Građevinski fakultet, Andris, Zagreb, 2006. 5. Behaim, B.: Armirani beton, Ars nova, Zagreb, 2010. Dodatna: 6. HRN EN 1990:2011. Eurokod. Osnove projektiranja konstrukcija + nacionalni dodatak. 7. HRN EN 1991:2012. Eurokod 1. Djelovanja na konstrukcije + nacionalni dodatak. 8. HRN EN 1992:2013. Eurokod 2. Projektiranje betonskih konstrukcija + nacionalni dodatak. 9. HRN EN 1998:2011. Eurokod 8. Projektiranje potresne otpornosti konstrukcija + nacionalni dodatak. 10. Tehnički propis za betonske konstrukcije, 2009.										
Students obligations	Maximum of 3 absences from exercises.										
Knowledge evaluation during semester	Redovitost pohađanja. Kolokviji. Numerički zadaci. Teorijska pitanja. Seminarski rad.										
Knowledge evaluation after semester	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).										
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> <tr> <td>(Seminar Work)</td><td>1</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Oral exam)	2	(Seminar Work)	1	(Constantly tested knowledge)	1	(Written exam)	1
Aktivnost	ECTS										
(Oral exam)	2										
(Seminar Work)	1										
(Constantly tested knowledge)	1										
(Written exam)	1										
Remark	This course can be used for final thesis theme										
Prerequisites:	Students cannot enroll in this course unless they have passed Matematika I Students cannot enroll in this course unless they have completed Građevinski materijali Students cannot enroll in this course unless they have passed Nacrtna geometrija u graditeljstvu I Students cannot enroll in this course unless they have completed Proračun konstrukcija Students cannot pass this course unless they have passed Proračun konstrukcija										
ISVU equivalents:	22348;										



Code WEB/ISVU	23430/155927	ECTS	5.0	Academic year	2018/2019
Name	Concrete Structures II				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+20+0+0) 90
Teachers	Lectures:1. dr.sc. Igor Gukov , dipl.ing.grad. Auditory exercises:dr.sc. Igor Gukov , dipl.ing.grad. Auditory exercises: Ivan Volarić struč.spec.ing.aedif. Laboratory exercises:dr.sc. Igor Gukov , dipl.ing.grad. Laboratory exercises: Ivan Volarić struč.spec.ing.aedif.				
Course objectives	Students will acquire theoretical and practical knowledge and skills as necessary for the analysis of reinforced concrete and prestressed structures.				
Learning outcomes:	1.calculate all actions on concrete structures. Level:6 2.calculate an in-plane design model using a computer program. Level:6 3.calculate a simple spatial model of a structure using a computer program. Level:6 4.check bearing capacity of an element using the limit state method. Level:6 5.draw bending schedules with the definition of quantities using a computer program. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Modelling Questions and answers 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.				
Methods of carrying out auditory exercises	Laboratory exercises, computer simulations Traditional literature analysis Data mining and knowledge discovery on the Web Computer simulations Workshop 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.				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Traditional literature analysis Data mining and knowledge discovery on the Web Computer simulations Workshop				
Course content lectures	1.Actions on structures., 2h, Learning outcomes:1 2.Prestressed structures. Basic concepts, materials, historical development, types and systems of prestressing., 2h, Learning outcomes:2 3.Prestressing force, loss of prestressing force., 2h, Learning outcomes:2 4.Calculation Prestressed the concrete section in bending. Ultimate limit state., 2h, Learning outcomes:2 5.Transverse force. Splitting forces., 2h, Learning outcomes:4 6.Details and constructive rules for prestressed concrete structures, 2h, Learning outcomes:4 7.The required cross-sectional geometry. External prestressing., 2h, Learning outcomes:2 8.Serviceability limit state. Prestressing in statically indeterminate systems., 2h, Learning outcomes:4 9.Calculation, reinforcement and construction of reinforced concrete slabs., 2h, Learning outcomes:4,5 10.Calculation, reinforcement and construction of reinforced concrete beams., 2h, Learning outcomes:4,5 11.Calculation, reinforcement and construction of reinforced concrete columns and walls., 2h, Learning outcomes:4,5 12.Calculation, reinforcement and construction of reinforced concrete foundations., 2h, Learning outcomes:4,5 13.Calculation, reinforcement and construction of reinforced concrete staircases., 2h, Learning outcomes:4,5 14.Calculation, reinforcement and construction of reinforced concrete wall bracket., 2h, Learning outcomes:4,5 15.Colloquium., 2h, Learning outcomes:4,5				
Course content auditory	1.Creating a static model of plane slab using a computer., 1h, Learning outcomes:1 2.Dimensioning of slabs and beams. Creating reports., 1h, Learning outcomes:2 3.Creating a static spatial models more storey residential building., 1h, Learning outcomes:3 4.Static, dynamic and seismic analysis of the spatial model., 1h, Learning outcomes:3 5.Dimensioning of plates, beams, columns and walls. Creating reports., 1h, Learning outcomes:3 6.The first colloquium, spatial design model more storey residential building., 1h, Learning outcomes:3 7.Creating static model prefabricated concrete halls., 1h, Learning outcomes:3 8.Placing basic load and earthquakes., 1h, Learning outcomes:1 9.Dimensioning of columns and beams., 1h, Learning outcomes:4 10.Creating a reinforcement drawing for the slab., 1h, Learning outcomes:5 11.Creating a reinforcement draft for the walls., 1h, Learning outcomes:5 12.Creating a reinforcement draft for beam., 1h, Learning outcomes:5 13.Creating a reinforcement draft for the pillars., 1h, Learning outcomes:5 14.Creating a reinforcement draft for foundations and stairs., 1h, Learning outcomes:5 15.The second colloquium, an independent production of rebar draft plate and beams. , 1h, Learning outcomes:5				
Course content laboratory	1.Creating a static model of plane slab using a computer., 1h, Learning outcomes:1 2.Dimensioning of slabs and beams. Creating reports., 1h, Learning outcomes:2 3.Creating a static spatial models more storey residential building., 1h, Learning outcomes:3 4.Static, dynamic and seismic analysis of the spatial model., 1h, Learning outcomes:3 5.Dimensioning of plates, beams, columns and walls. Creating reports., 1h, Learning outcomes:3 6.The first colloquium, spatial design model more storey residential building., 1h, Learning outcomes:3				

	7.Creating static model prefabricated concrete halls., 1h, Learning outcomes:3 8.Placing basic load and earthquakes., 1h, Learning outcomes:1 9.Dimensioning of columns and beams., 1h, Learning outcomes:4 10.Creating a reinforcement drawing for the slab., 1h, Learning outcomes:5 11.Creating a reinforcement draft for the walls., 1h, Learning outcomes:5 12.Creating a reinforcement draft for beam., 1h, Learning outcomes:5 13.Creating a reinforcement draft for the pillars., 1h, Learning outcomes:5 14.Creating a reinforcement draft for foundations and stairs., 1h, Learning outcomes:5 15.The second colloquium, an independent production of rebar draft plate and beams. , 1h, Learning outcomes:1,2,3,4,5								
Required materials	Basic: classroom, blackboard, chalk... Overhead projector								
Exam literature	Osnovna: 1. Gukov, I.: Betonske konstrukcije I. Skripta Tehničkog veleučilišta u Zagrebu. Zagreb. 2010. 2. Sorić, Z., Kišiček, T.: Betonske konstrukcije 1. Sveučilišta u Zagrebu. Građevinski fakultet. Zagreb. 2014. 3. Radić, J. i suradnici: Betonske Konstrukcije Priručnik, Hrvatska sveučilišna naklada, Sveučilište u Zagrebu, Građevinski fakultet, SECON HNDK, Andris, Zagreb, 2006. 4. Radić, J. i suradnici: Betonske Konstrukcije Riješeni primjeri, Hrvatska sveučilišna naklada, Sveučilište u Zagrebu, Građevinski fakultet, Andris, Zagreb, 2006. 5. Behaim, B.: Armirani beton, Ars nova, Zagreb, 2010. Dodatna: 6. HRN EN 1990:2011. Eurokod. Osnove projektiranja konstrukcija + nacionalni dodatak. 7. HRN EN 1991:2012. Eurokod 1. Djelovanja na konstrukcije + nacionalni dodatak. 8. HRN EN 1992:2013. Eurokod 2. Projektiranje betonskih konstrukcija + nacionalni dodatak. 9. HRN EN 1998:2011. Eurokod 8. Projektiranje potresne otpornosti konstrukcija + nacionalni dodatak. 10. Tehnički propis za betonske konstrukcije, 2009.								
Students obligations	Uvjet za potpis stjese obranom izrag programa, položenim kolokvijima te pohađanjem nastave.								
Knowledge evaluation during semester	Redovitost pohađanja. Kolokvij, teorijska pitanja. Seminarski rad. Programski zadatak.								
Knowledge evaluation after semester	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)								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Written exam)	2	(Oral exam)	2	(Constantly tested knowledge)	1
Aktivnost	ECTS								
(Written exam)	2								
(Oral exam)	2								
(Constantly tested knowledge)	1								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot pass this course unless they have passed Betonske konstrukcije I Students cannot enroll in this course unless they have completed Betonske konstrukcije I Students cannot enroll in this course unless they have passed Građevinski materijali								
ISVU equivalents:	22382;								

Code WEB/ISVU	23457/155966	ECTS	5.0	Academic year	2018/2019
Name	Conduct of Company Business Operations				
Status	5th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (12+0+0+18) 90
Teachers	Lectures:mr. Alenka Poljičak dipl.oec., viši predavač Auditory exercises:mr. Alenka Poljičak dipl.oec., viši predavač Construction exercises:mr. Alenka Poljičak dipl.oec., viši predavač				
Course objectives	Provide students with basic knowledge about business management and learn how to master the basic skills of business process management and business functions.				
Learning outcomes:	1.Analyze the legal and business forms of a company. Level:6 2.Define the Significance of Strategic Management. Level:7 3.Analyze processes and business functions in a business organization. Level:6 4.Design documents relevant to the company s business. Level:6 5.to reconsider the specificity of the business. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Workshop				
How construction exercises are held	Discussion, brainstorming Workshop				
Course content lectures	1.Establishment of a company - legislative framework, 2h, Outcome 6, 2h, Learning outcomes:3 2.Specificity of the main activity as a prerequisite and prerequisite for business organization, 2h, Learning outcomes:1 3.Specificity of the main activity as a prerequisite and prerequisite for business organization, 2h, Learning outcomes:3 4.Organization and management of the company, 2h, Learning outcomes:3 5.Strategy and strategy management, 2h, Learning outcomes:3 6.Stakeholders and the business environment, 2h, Learning outcomes:2 7.Porter, 2h, Learning outcomes:3 8.Business functions of the company, 2h, Learning outcomes:3 9.Organizational models, 2h, Learning outcomes:2 10.Value Chain, 2h, Learning outcomes:3 11.Marketing mix Outcome 5, 2h, Learning outcomes:2 12.Business and Financial Report on Business Outcome 4, 2h, Learning outcomes:3 13.Business Communication Outcome 4, 2h, Learning outcomes:2 14.Creating a business plan I Outcome 6, 2h, Learning outcomes:2 Creating a business plan II Outcome 6, 2h, Learning outcomes:3 15.Business Digitization Outcome 5, 2h, Learning outcomes:2				
Course content auditory	1.1. Analysis of various legislative frameworks for establishing a legal form of company. 2h, Outcome 6, 2h, Learning outcomes:1 2.2. Understanding the Impact of Main Activity on Quality Management. 2h; Outcome 3., 2h, Learning outcomes:1 3.4. Formulation of strategy and understanding of strategic management significance, 2h, Outcome 2., 2h, Learning outcomes:1 4.6. Development Strategies, 2h, Outcome 6., 2h, Learning outcomes:1 5.10. Balance Sheet and Profit and Loss Account, 2h, Outcome 6., 2h, Learning outcomes:1 6.11. Business correspondence and communication, 2h, Outcome 4., 2h, Learning outcomes:1 7.no lectures, 2h 8.no lectures, 2h 9.no lectures, 2h 10.no lectures, 2h 11.no lectures, 2h 12.no lectures, 2h 13.no lectures, 2h 14.no lectures, 2h 15.no lectures, 2h				
Course content constructs	1.3. Showing the organizational charts classification, 2h, Exit 3., 2h, Learning outcomes:1 2.5. Defining the major stakeholders in business, 2h, Outcome 3., 2h, Learning outcomes:1 3.7. I. colloquium, preparing and conducting a colloquia, 2h, Exodus 2,3,4,5, 2h, Learning outcomes:1 4.8. Business Functions, 2h, Outcome 4., 2h, Learning outcomes:1 5.9. Value chain - value chain, 2h, Outcome 5., 2h, Learning outcomes:1 6.12. Making a business plan, 2h. Outcome 6., 2h, Learning outcomes:1 7.13. Discussion on digitalization and business improvement., 2h, Learning outcomes:1 8.14. II. colloquium, preparation and implementation, 2h, Exodus 2,3,4,5, 2h, Learning outcomes:1 9.15. Interesting Case Studies, 2h, Exits 6., 2h, Learning outcomes:1 10.no lectures, 2h, Learning outcomes:1 11.no lectures, 2h, Learning outcomes:1 12.no lectures, 2h, Learning outcomes:1 13.no lectures, 2h, Learning outcomes:1 14.no lectures, 2h, Learning outcomes:1				

	15.no lectures, 2h, Learning outcomes:1								
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector								
Exam literature	1. Alenka Poljičak Poslovanje tvrtke skripta sa predavanja, Tehničko veleučilište u Zagrebu 2017. 2. Zakon o trgovačkim društvima 2.Zakon o obrtu, Zakon o ustanovama 3.Sikavica, Pere: Organizacija Školska knjiga Zagreb 2011. Dopunska literatura 1.Appelo, Jurgen: Management 3.0 Leading Agile Develepor, Developing Agile Leader, Addison-Wesles, Boston, MA 2011. 2.Žager, Katarina i dr.: Analiza financijskih izvještaja, RIF, Zagreb 2017. 3.Bovee,C.L., Thill, J.V.: Suvremena poslovna komunikacija, Mate d.o.o. Zagreb, 2012.								
Students obligations	classes attendance - min 50%								
Knowledge evaluation during semester	2 colloquium								
Knowledge evaluation after semester	writen and oral exam								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Activity in class)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>3</td></tr> <tr> <td>(Oral exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Activity in class)	1	(Written exam)	3	(Oral exam)	1
Aktivnost	ECTS								
(Activity in class)	1								
(Written exam)	3								
(Oral exam)	1								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have completed Tržište i poslovno okruženje Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Matematika II								
ISVU equivalents:	22367;								
Proposal made by	Alenka Poljičak, 01/05/2018.								



Code WEB/ISVU	23919/184646	ECTS	6.0	Academic year	2018/2019
Name	Construction calculation				
Status	2nd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (24+0+0+6) 120
Teachers	Lectures:1. dr.sc. Dalibor Gelo mag.ing.aedif. Lectures:2. mr.sc. Željko Lebo v. pred. Auditory exercises:mr.sc. Jure Galić predavač Auditory exercises:dr.sc. Dalibor Gelo mag.ing.aedif. Auditory exercises:mr.sc. Željko Lebo v. pred. Construction exercises:mr.sc. Jure Galić predavač Construction exercises:dr.sc. Dalibor Gelo mag.ing.aedif. Construction exercises:mr.sc. Željko Lebo v. pred.				
Course objectives	Acquiring basic theoretical and practical notions on structural design, aimed at ensuring better understanding of design documents and solving simple structural problems when encountered in the construction process.				
Learning outcomes:	1.test static systems, particularly with regard to their geometric invariability. Level:6 2.differentiate geometrically invariable statically determinate and statically indeterminate beam systems. Level:6 3.calculate internal forces of statically determinate and statically indeterminate planar beam systems. Level:6 4.draw diagrams of internal forces for statically determinate and statically indeterminate planar beam systems. Level:6 5.calculate displacements and angles of turn for planar beam static systems. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Modelling Discussion 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.				
Methods of carrying out auditory exercises	Group problem solving				
How construction exercises are held	Group problem solving				
Course content lectures	1.Introduction. Assumptions beam static. static systems, 2h, Learning outcomes:1,2 2.Connections, geometric stability and statical determined systems. Classifications, 2h, Learning outcomes:1,2 3.Statical determined systems, simple systems, 2h, Learning outcomes:1,2,3,4,5 4.Gerbbers beams, 2h, Learning outcomes:1,2,3,4,5 5.Statical determined systems, truss systems, 2h, Learning outcomes:1,2,3,4,5 6.Three hinged frame and arc, 2h, Learning outcomes:1,2,3,4,5 7.First colloquium, 2h, Learning outcomes:1,2,3,4,5 8.Three hinged frame and arc with tie rod, 2h, Learning outcomes:1,2,3,4,5 9.Strengthened beams (Langer beam) - analytical and semigraphical, 2h, Learning outcomes:1,2,3,4,5 10.Point displacement of bar systems, 2h, Learning outcomes:1,2,3,4,5 11.Second colloquium, 2h, Learning outcomes:1,2,3,4,5 12.Force method - general, 2h, Learning outcomes:1,2,3,4,5 13.Force method - application, 2h, Learning outcomes:1,2,3,4,5 14.Displacement method, 2h, Learning outcomes:1,2,3,4,5 15.Third colloquium, 2h, Learning outcomes:1,2,3,4,5				
Course content auditory	1.no classes, 2h 2.Introductions connections, geometric unchangeable systems, static defined constructions and static undefined constructions., 2h, Learning outcomes:1 3.Beam, console and beam with console differential relationship, 2h, Learning outcomes:1,2,3 4.Gerbbers beams - analytical and semigraphical method, 2h, Learning outcomes:1,2,3 5.Truss structure - analytical, Ritter and Cullman calculation methods, 2h, Learning outcomes:1,2,3 6.no classes 7.Three-hinged arch and frames - analytical and graphical, 2h, Learning outcomes:1,2,3 8.Three-hinged arch and frames with tie rod, analytical, graphical determination of forces in the section, 2h, Learning outcomes:1,2,3,4 9.Strengthened beams (Langer beam) - analytical and semigraphical, 2h 10.no classes 11.Deformation calculation., 2h, Learning outcomes:1,2,3,4,5 12.Force method - once static undefined system, 2h, Learning outcomes:1,2,3,4,5 13.Force method - once static undefined system, 2h, Learning outcomes:1,2,3,4,5 14.no classes 15.Force method - twice static undefined system, 2h, Learning outcomes:1,2,3,4,5				
Course content constructures	1.no classes, 2h 2.no classes, 2h 3.no classes, 2h 4.no classes, 2h 5.no classes, 2h 6.Geometric stability, Gerbbers beams, truss systems, 2h, Learning outcomes:1,2,3,4,5 7.no classes, 2h 8.no classes, 2h				

	9.no classes, 2h 10.Three hinged frame and arc, three hinged frame and arc with tie rod, Langer beams, 2h, Learning outcomes:1,2,3,4 11.no classes, 2h 12.no classes, 2h 13.no classes, 2h 14.Point displacement of bar systems, Force method, 2h, Learning outcomes:1,2,3,4,5 15.no classes, 2h										
Required materials	Basic: classroom, blackboard, chalk... Overhead projector										
Exam literature	Basic literature: 1. Ž. Lebo: Separati s predavanja 2. Rak, Gelo: Proračun konstrukcija 2. Lj. Kopričanec-Matijevac: Zbirka zadataka iz proračuna konstrukcija, TVZ, Zagreb 2011. 3. M. Anđelić: Građevna statika II, Zagreb 2005. 4. V. Simović: Građevna statika I., Građevinski institut, Zagreb, 1988. Additional literature: 1. V. Šimić: Otpornost materijala I, Školska knjiga, Zagreb, 1992. 2. V. Šimić: Otpornost materijala II, Školska knjiga, Zagreb, 1995. 3. M. Anđelić: Statika neodređenih štapnih konstrukcija, DHGK, Zagreb, 1993. 4. Riješeni primjeri kolokvija i ispitnih zadataka na mrežnim stranicama predmeta										
Students obligations	Class attendance. Minimum of 75 points in three exams. Minimum of 25 points per exam.										
Knowledge evaluation during semester	Class attendance. Exams: numerical examples, theoretical questions										
Knowledge evaluation after semester	Written examination. Verbal examination.										
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>2</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>2</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	2	(Constantly tested knowledge)	2	(Written exam)	1	(Oral exam)	1
Aktivnost	ECTS										
(Classes attendance)	2										
(Constantly tested knowledge)	2										
(Written exam)	1										
(Oral exam)	1										
Remark	This course can not be used for final thesis theme										
Prerequisites:	Students cannot enroll in this course unless they have completed Tehnička mehanika Students cannot pass this course unless they have passed Tehnička mehanika										
ISVU equivalents:	22334;155968;										
Proposal made by	mr.sc. Željko Lebo v. pred. dr.sc., Dalibor Gelo mag.ing.aedif. 3.4.2017.										

Code WEB/ISVU	22882/22358	ECTS	4.0	Academic year	2018/2019
Name	Construction Machinery				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+15 (15+0+0+0) 75
Teachers	Lectures:1. v.predavač Boris Uremović dipl.ing.građ. Lectures:2. mr.sc. Petar Adamović prof.v.škole Auditory exercises: Domagoj Šojat struč.spec.ing.aedif. Auditory exercises:v.predavač Boris Uremović dipl.ing.građ. Auditory exercises: Sanela Vojnović mag.ing.aedif				
Course objectives	The aim of the course is to teach students about the possibilities and operation of construction machines, and about the way in which they are included in complex technological processes during realization of civil engineering and building projects.				
Learning outcomes:	1.make distinction between standard construction machines and other required construction machinery and equipment. Level:6 2.analyse the technique, technology, logistics and organisation of technological processes used in earth, concrete and asphalt works. Level:6 3.specify types of construction machines, transport devices and other technological equipment for realization of works. Level:6 4.form groups of construction machines and transport vehicles for the realization of construction works. Level:6,7 5.establish flow diagrams and technology-based maps for utilisation of construction machinery in construction works. Level:6 6.calculate performance of standard construction machines and transport devices (performance of vehicles and cranes). Level:6 7.anticipate types of logistic, technical and technological resources that are needed for realization of construction works. Level:6,7 8.develop possible alternatives for organizing technological and logistical processes relating to earthworks, concrete works and asphalt works. Level:6,7 9.combine possible alternatives for organizing technological and logistical processes relating to selection of construction machinery. Level:6,7 10.define an optimum construction machinery with regard to organisation of technological and logistical processes during construction work. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Discussion Questions and answers Other 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.				
Methods of carrying out auditory exercises	Group problem solving 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 content lectures	1.Construction technique and technology (construction works, construction technique and technology, construction machinery, properties of modern construction machinery), 2h, Learning outcomes:1,2,3,5 2.Construction technique and technology (construction works, construction technique and technology, construction machinery, properties of modern construction machinery), 1h, Learning outcomes:1,2,3,5 Transport vehicles and devices used in construction industry (transport during construction, loaders and vehicles carrying tower cranes and other cranes, construction site lifts and elevators), 1h, Learning outcomes:1,2,3 3.Transport vehicles and devices used in construction industry (transport during construction, loaders and vehicles carrying tower cranes and other cranes, construction site lifts and elevators), 2h, Learning outcomes:1,2,3 4.Machines and technological equipment for earthworks and geotechnical works in soil and rock: (earthworks, surface excavation in soil and rock, bulldozers, scrapers, rock ripping machines, excavators, excavator implements and tools, trench excavators), 2h, Learning outcomes:3,4,7,9,10 5.Machines and technological equipment for earthworks and geotechnical works in soil and rock: (earthworks, surface excavation in soil and rock, bulldozers, scrapers, rock ripping machines, excavators, excavator implements and tools, trench excavators), 1h, Learning outcomes:3,4,7,9,10 Machines and equipment for rock mining, mobile crushing plants, machines for placement of loose materials, 1h, Learning outcomes:3,4,7,9,10 6.Machines and equipment for rock mining, mobile crushing plants, machines for placement of loose materials, 2h, Learning outcomes:3,4,7,9,10 7.Selection of machines for surface earthworks, machines and equipment for geotechnical and underground works, machines and equipment for demolition of buildings, 2h, Learning outcomes:3,4,7,9,10 8.Selection of machines for surface earthworks, machines and equipment for geotechnical and underground works, machines and equipment for demolition of buildings, 1h, Learning outcomes:3,4,7,9,10 Machines and technological equipment for concrete and asphalt works: (concrete works, transported concrete, equipment, production of fresh concrete, concrete plant, equipment for transport and placing of fresh concrete), 1h, Learning outcomes:3,4,7,8,9,10 9.Machines and technological equipment for concrete and asphalt works: (concrete works, transported concrete, equipment, production of fresh concrete, concrete plant, equipment for transport and placing of fresh concrete), 2h, Learning outcomes:3,4,7,8,9,10 10.Equipment for realization of surface concrete and plasters, selection of machines for concrete works, 2h, Learning outcomes:3,4,7,8,9,10 11.Equipment for realization of surface concrete and plasters, selection of machines for concrete works, 1h, Learning outcomes:3,4,7,8,9,10 Asphalt works, asphalt concrete placing equipment, equipment for realization of asphalt macadam roads, equipment for rehabilitation of asphalt pavements, 1h, Learning outcomes:3,4,7,9,10				

	12. Asphalt works, asphalt concrete placing equipment, equipment for realization of asphalt macadam roads, equipment for rehabilitation of asphalt pavements, 2h, Learning outcomes:3,4,7,9,10 13. Performance of standard construction machines and transport vehicles, 2h, Learning outcomes:6 14. Performance of standard construction machines and transport vehicles, 1h, Learning outcomes:6 Selection of machines and planning of machine work in construction, 2h, Learning outcomes:4,7,8,9,10 15. Selection of machines and planning of machine work in construction, 2h, Learning outcomes:4,7,8,9,10						
Course content auditory	1. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 2. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 3. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 4. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 5. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 6. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 7. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 8. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 9. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 10. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 11. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 12. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 13. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 14. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8 15. Solving problems relating to: technological system determination, performance of construction machines, harmonization of work in a group for a given technological system, and for various types of work., 1h, Learning outcomes:4,5,6,8						
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment						
Exam literature	Obvezna 1. Z. Linarić : Leksikon strojeva i opreme za proizvodnju građevinskih materijala, Učinci građevinskih strojeva i vozila pri zemljanim radovima, biblioteka Mineral, Business Media Croatia d.o.o., Zagreb, 2007. 2. P. Đukan i suradnici: Strojevi u građevinarstvu, Građevinar, Zagreb, 1991 3. E. Slunjski: Strojevi u građevinarstvu, Sveučilište u Zagrebu, 1995. Additional literature: 1. Z. Linarić : Postrojenja za proizvodnju sipkih i povezanih mineralnih gradiva, drobilane, tvornice betona, asfaltne baze, biblioteka Mineral, Business Media Croatia d.o.o., Zagreb, 2009 2. R. Lončarić: Organizacija graditeljskih projekata , Sveučilište u Zagrebu, Zagreb, 1995, 3. Freddy L. Roberts i dr.: Vruće asfaltne mješavine, HSGI, 2003.						
Students obligations	maximum of 3 absences from exercises						
Knowledge evaluation during semester	Redovitost pohaa#5#0#60\$Kolokvij, numeri zadaci#1#34#60\$Kolokvij, teorijska pitanja#2#66#60\$						
Knowledge evaluation after semester	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)						
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Classes attendance)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Written exam)	2	(Classes attendance)	2
Aktivnost	ECTS						
(Written exam)	2						
(Classes attendance)	2						



Remark	This course can not be used for final thesis theme
Prerequisites:	No prerequisites.
Proposal made by	v.predavač Boris Uremović dipl.ing.grad., 17.9.2018



Code WEB/ISVU	23453/155962	ECTS	5.0	Academic year	2018/2019
Name	Construction Management I				
Status	5th semester - Building Construction (Redovni graditeljstvo) - obligatory course5th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course5th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course5th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+0+20) 90
Teachers	Lectures:1. mr.sc. Petar Adamović prof.v.škole Lectures:v.predavač Boris Uremović dipl.ing.građ. Auditory exercises: Nina Šantek struč.spec.ing.aedif., predavač Auditory exercises: Domagoj Šojat struč.spec.ing.aedif. Auditory exercises: Sanela Vojnović mag.ing.aedif Construction exercises: Nina Šantek struč.spec.ing.aedif., predavač Construction exercises: Domagoj Šojat struč.spec.ing.aedif. Construction exercises: Sanela Vojnović mag.ing.aedif				
Course objectives	Students will acquire theoretical, practical and operative knowledge and skills for the management of construction work on various civil engineering and building projects.				
Learning outcomes:	1.analyse the project implementation design. Level:6 2.anticipate work methods and construction technology. Level:6,7 3.create work processes documented with technology maps and flow diagrams. Level:6,7 4.calculate resources needed (material, labour, machinery). Level:6 5.plan construction time by creating the critical path diagram and bar charts showing requirements in terms of personnel and machinery. Level:6,7 6.draw the site organisation chart with the calculation of storage areas. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other 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.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other 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	Group problem solving Discussion, brainstorming Other Students independently solve problems as needed for preparation of the assignment (construction management project in civil engineering and building engineering).				
Course content lectures	1.Introduction to construction management; definitions and basic terms, 2h, Learning outcomes:1 2. Work processes and their properties (classification, presentation), 2h, Learning outcomes:1,2 3.Organization and classification of construction processes , 2h, Learning outcomes:3 4. Preparation and organization of production in construction industry , 2h, Learning outcomes:3,4 5.Production downtimes and related losses, 2h, Learning outcomes:1,5 6.Construction management project (purpose and components), 2h, Learning outcomes:1,2,5 7.Work method selection and design of technological processes, 2h, Learning outcomes:2,3,4 8.Site organisation, 2h, Learning outcomes:4,6 9.Purpose and objective of planning in construction industry, 2h, Learning outcomes:5 10.Classification of plans, 2h, Learning outcomes:4,5 11.Classification of plans, 2h, Learning outcomes:4,5 12.Selecting plan type and plan elaboration methodology, 2h, Learning outcomes:4,5 13.Selecting plan type and plan elaboration methodology, 2h, Learning outcomes:4,5 14.Plan elaboration procedure (activities, relationships, time calculation, representation), 2h, Learning outcomes:4,5 15.Plan elaboration procedure (activities, relationships, time calculation, representation), 2h, Learning outcomes:4,5				
Course content auditory	1.Bill of quantities, 2h, Learning outcomes:1,4 2.no classes 3.no classes 4.no classes 5.Summary of materials , 2h, Learning outcomes:1,4 6.no classes 7.no classes 8.no classes 9.Selection of machines and equipment, machine performance selection, harmonization of work in a group, composition of work groups , 2h, Learning outcomes:4 10.Selection of machines and equipment, machine performance selection, harmonization of work in a group, composition of work groups , 1h, Learning outcomes:4 11.no classe 12.no classes 13.Analyzing structure of time schedules , 2h, Learning outcomes:5 14.no classes 15.no classes				

Course content constructs	1.no classes 2.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,4 3.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,4 4.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,4 5.no classes 6.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,4 7.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,4 8.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,4 9.no classes 10.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 1h, Learning outcomes:4 11.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:4 12.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:4 13.no classes 14.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:5 15.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:5								
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment								
Exam literature	Basic literature: 1. J.Izetbegović,V.Žerjav:Organizacija građevinske proizvodnje,Sveučilišni udžbenik Zagreb,2009 2. G.Bučar: Normativi i cijene u graditeljstvu, Sveučilište u Rijeci, Rijeka, 2003. 3. M.Katavić:Osnove ekonomije za graditelje; Hrvatska Sveučilišna naklada, Zagreb 2009. Additional literature: 1. J. Klepac: Organizacija građenja, Sveučilište u Zagrebu,Građevinski fakultet, 1984. 2. J. Marušić: Organizacija građenja, Sveučilište u Zagrebu, 1994.								
Students obligations	maximum of 3 absences from exercises								
Knowledge evaluation during semester	Redovitost pohaa#5#0#60\$Kolokvij, numerički zadaci#1#20#60\$Kolokvij, teorijska pitanja#1#20#60\$Programski zadatak#1#10#100\$Usmena provjera znanja#1#50#50\$								
Knowledge evaluation after semester	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).								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Project)</td><td>2</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Project)	2	(Written exam)	1	(Oral exam)	2
Aktivnost	ECTS								
(Project)	2								
(Written exam)	1								
(Oral exam)	2								
Remark	This course can not be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Matematika II Students cannot pass this course unless they have passed Građevinski strojevi Students cannot enroll in this course unless they have completed Građevinski strojevi								
ISVU equivalents:	22360;								
Proposal made by	mr.sc. Petar Adamović, 17.9.2018								

Code WEB/ISVU	23454/155963	ECTS	5.0	Academic year	2018/2019
Name	Construction Management II				
Status	6th semester - Building Construction (Redovni graditeljstvo) - obligatory course6th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course6th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course6th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+0+20) 90
Teachers	Lectures:1. mr.sc. Petar Adamović prof.v.škole Lectures: Nina Šantek struč.spec.ing.aedif., predavač Auditory exercises: Nina Šantek struč.spec.ing.aedif., predavač Auditory exercises: Domagoj Šojat struč.spec.ing.aedif. Auditory exercises: Sanela Vojnović mag.ing.aedif Construction exercises: Nina Šantek struč.spec.ing.aedif., predavač Construction exercises: Domagoj Šojat struč.spec.ing.aedif. Construction exercises: Sanela Vojnović mag.ing.aedif				
Course objectives	Students will acquire theoretical, practical and operative knowledge and skills for the management of construction work on various civil engineering and building projects.				
Learning outcomes:	1.calculate construction costs for a building/structure. Level:6 2.prepare public procurement documents. Level:6,7 3.establish a work procurement procedure. Level:6,7 4.manage construction site documentation. Level:6,7 5.prepare work payment proposal. Level:6,7 6.schedule handover of works and final account. Level:6,7 7.organise participants and procedures in all phases of construction work. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other				
How construction exercises are held	Group problem solving Discussion, brainstorming Other				
Course content lectures	1.Introduction to the cost theory; notion of cost, type and location of cost , 2h, Learning outcomes:1 2.Business principles, rationalization, productivity, economic considerations, profitability , 2h, Learning outcomes:1 3.Business principles, rationalization, productivity, economic considerations, profitability , 2h, Learning outcomes:1 4.Cost planning and controlling, 2h, Learning outcomes:1,2 5. Notion of cost estimation; types, structures and methods of cost estimation, 2h, Learning outcomes:1,2 6. Calculation of direct costs; price analysis, 2h, Learning outcomes:1,2 7. Calculation of direct costs; price analysis, 2h, Learning outcomes:1,2 8.Calculation of indirect costs, factor calculation , 2h, Learning outcomes:1,2 9.Legal standards, legal subjects, legal relationships, types of obligations and their legal effects, 2h, Learning outcomes:3,7 10.Construction law, 2h, Learning outcomes:3,4,7 11.Technical documentation, 2h, Learning outcomes:4 12.Administrative permits (location permit, building permit, and operating permit) , 2h, Learning outcomes:6,7 13. Law on public procurement of work, 2h, Learning outcomes:3,5 14.Construction site documentation , 2h, Learning outcomes:4 15.Payment of work , 2h, Learning outcomes:5,6				
Course content auditory	1.List of activities with time calculation for each activity, 1h, Learning outcomes:6 2.no classes 3.Critical path diagram with time analysis (PDM method), 2h, Learning outcomes:6 4.no classes 5.no classes 6.Gantt chart, bar chart, 2h, Learning outcomes:4 7.no classes 8.Labour lodging requirement calculation, storage space calculation, 1h, Learning outcomes:4 9.no classes 10.Construction site layout , 2h, Learning outcomes:4 11.no classes 12.Price analysis, cost estimate, 2h, Learning outcomes:1,2 13.no classes 14.no classes 15.no classes				
Course content constructs	1.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 1h, Learning outcomes:6 2.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:6				

	3.no classes, Learning outcomes:6 4.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:6 5.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:6 6.no classes 7.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:4 8.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 1h, Learning outcomes:4 9.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:4 10.no classes 11.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:4 12.no classes 13.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,2 14.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,2 15.Each student prepares the program assignment entitled: Construction management project in civil engineering and building engineering, 2h, Learning outcomes:1,2								
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment								
Exam literature	Basic literature: 1. J.Izetbegović; V.Žerjav: Organizacija građevinske proizvodnje, Sveučilišni udžbenik, Zagreb, 2009 2. Uremović B.; Dunović Č: Planiranje projekata uz pomoć programskog alata Microsoft Project 2012 Additional literature: 1. R. Lončarić: Organizacija izvedbe graditeljskih projekata, Hrvatsko Društvo Građevinskih Inženjera, Zagreb 1995. 2. G. Bučar: Normativi i cijene u graditeljstvu, Sveučilište u Rijeci, Rijeka, 2003.								
Students obligations	maximum of 3 absences from exercises								
Knowledge evaluation during semester	Redovitost pohaa#5#0#60\$Kolokvij, numerički zadaci#1#20#60\$Kolokvij, teorijska pitanja#1#20#60\$Programski zadatak#1#10#100\$Usmena provjera znanja#1#50#50\$								
Knowledge evaluation after semester	Written exam Oral exam								
Student activities:	<table> <tr> <td>Aktivnost (Project)</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Oral exam)</td><td>1</td></tr> <tr> <td></td><td>2</td></tr> </table>	Aktivnost (Project)	ECTS	(Written exam)	2	(Oral exam)	1		2
Aktivnost (Project)	ECTS								
(Written exam)	2								
(Oral exam)	1								
	2								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have completed Tehnologija građenja Students cannot enroll in this course unless they have completed Organizacija građenja I Students cannot pass this course unless they have passed Organizacija građenja I								
ISVU equivalents:	22361;								
Proposal made by	mr.sc. Petar Adamović, prof.v.škole, 17.9.2018								

Code WEB/ISVU	23915/184642	ECTS	5.0	Academic year	2018/2019
Name	Construction Materials				
Status	1st semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (18+12+0+0) 90
Teachers	Lectures: Tomislav Svaguša Lectures:mr.sc. Donka Wurth v. predavač Auditory exercises:mr.sc. Jure Galić predavač Auditory exercises:mr.sc. Donka Wurth v. predavač Laboratory exercises:mr.sc. Jure Galić predavač Laboratory exercises:mr.sc. Donka Wurth v. predavač				
Course objectives	Introducing students to the types and properties of materials and to their use in civil engineering				
Learning outcomes:	1.calculate composition of concrete of a given strength, durability and workability for a particular structural element. Level:6 2.draw grain size distribution curve for an aggregate. Level:6 3.test individual properties of aggregate, cement, fresh and hardened concrete. Level:6 4.analyse concrete testing results. Level:6 5.differentiate types of aggregate, cement, concrete admixtures, special types of concrete, brick products, glass and plastics. Level:6 6.differentiate good and bad properties of wood as a construction material (mechanical, physical, physicochemical properties, permanent strength and constant elasticity). Level:6 7.calculate displacements due to change in moisture and temperature on wood and steel elements. Level:6 8.plan testing of individual properties of steel, wood and brick products. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies 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.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other Students solve problems related to topics covered during the lectures. Students are prepared for laboratory sessions and for the preparation of programs.				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Group problem solving Discussion, brainstorming 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 content lectures	1.Information about materials. Statistical processing. Structure and correlation of substances., 2h, Learning outcomes:1 2.Aggregate., 2h, Learning outcomes:2,6 3.Binders. Cement. Additions, admixtures. Water., 2h, Learning outcomes:3,6 4.Fresh concrete. Composition of concrete of specified workability and strength. , 2h, Learning outcomes:6 5.Strength of concrete. Deformation of concrete., 2h, Learning outcomes:7 6.Production of concrete., 2h, Learning outcomes:6 7.Wood (chemical, physical, mechanical properties), 2h, Learning outcomes:8 8.Wood (durability, fire resistance, mildew and insects) , 2h, Learning outcomes:8 9.Construction steels. Methods of production. The properties of the steel. Types of construction steel, 2h, Learning outcomes:8 10.Stone, 2h, Learning outcomes:6 11.Special types of concrete and special concrete technologies, 2h, Learning outcomes:6 12.Quality control, quality assurance and quality management. Subsequent examination of the quality of concrete in construction, 2h, Learning outcomes:6 13.Mortars. Floors., 2h, Learning outcomes:5 14.Brick production, types of bricks and clay blocks., 1h, Learning outcomes:5 15.Tile, production and testing, 1h, Learning outcomes:5 Glass, plastic., 1h, Learning outcomes:5				
Course content auditory	1.No classes, 2h 2.Statistical processing. Physical parameters. Mechanical properties and permeability., 2h, Learning outcomes:1 3.Aggregate (aggregate grading, calculation of cumulative grading, influence of moisture and absorption of aggregate, determination of aggregate shape), 2h, Learning outcomes:2 4.Laboratory exercises, 2h 5.Laboratory exercises, 2h 6.Cement (significance, cement grade, calculation of mineralogical composition of cement, calculation of hydration heat, calculation of cement paste temperature, cement grade determination)., 2h, Learning outcomes:3 7.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)., 2h, Learning outcomes:4 8.Laboratory exercises, 2h 9.Laboratory exercises, 2h 10.Strength and deformation of concrete. Special tests (sclerometer, ultrasound, pull-off, concrete moisture, penetrability, reinforcing steel), 2h, Learning outcomes:5 11.Laboratory exercises, 2h 12.Laboratory exercises, 2h 13.Concrete composition design., 2h, Learning outcomes:6				

	14.Laboratory exercises, 2h 15.Laboratory exercises, 2h												
Course content laboratory	1.No classes, 2h 2.Auditory exercises, 2h 3.Auditory exercises, 2h 4.Determination of physical properties of materials (density, bulk density, absorption, surface moisture, moisture, water absorption, porosity)., 2h, Learning outcomes:1 5.Properties of aggregates (quartering, grading, aggregate grain shape testing, determination of silty and clayey particles in aggregate, grain shape determination)., 2h, Learning outcomes:2 6.Auditory exercises, 2h 7.Auditory exercises, 2h 8.Determination of basic properties of cement (standard consistence and density). , 2h, Learning outcomes:3 9.Concrete composition design, preparation of concrete mixes, testing properties of fresh concrete: consistence, pores, density, sampling., 2h, Learning outcomes:4 10.Auditory exercises, 2h 11.Determining strength and strain of concrete (compressive and tensile strength, modulus of elasticity). Non-destructive testing: sclerometer and ultrasound., 2h, Learning outcomes:5 12.Preliminary exam wood, steel and stone., 2h, Learning outcomes:8 13.Auditory exercises, 2h 14.Preliminary exam concrete., 2h, Learning outcomes:6 15.Preliminary exam bricks, tile, glass., 2h, Learning outcomes:5												
Required materials	Basic: classroom, blackboard, chalk... Special purpose laboratory Overhead projector Video equipment 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.												
Exam literature	Basic literature: 1. Ukrainczyk, V.: Poznavanje gradiva, Institut građevinarstva Hrvatske, Alcor, Zagreb, Udžbenik Sveučilišta u Zagrebu, 2001. 2. Ukrainczyk, V.: Beton: struktura, svojstva, tehnologija, Građevinski fakultet Sveučilišta u Zagrebu, 1994. 3. Bjegović, D. i dr.: Auditorne vježbe, Praktikum, Aktivna nastava, Građevinski fakultet Sveučilišta u Zagrebu, 1994. 4. Ashby Michael F., Jones David R.H.: Engineering Materials 1, Butterworth-Heinemann, Oxford-Boston-Johannesburg-Melbourne-NewDelhi-Singapore, 1996 5. Illston J.M., Construction Materials, their nature and behaviour, EFN SPON Chapman Hall, London-Glasgow-New mYork-Tokyo-Melburne-Madras, 1994												
Students obligations	maximum of 3 absences from exercises												
Knowledge evaluation during semester	Kolokvij, numeri zadaci#2#30#50\$Kolokvij, teorijska pitanja#3#60#50\$Programski zadatak#1#10#0\$												
Knowledge evaluation after semester	The examination consists of the written and oral portions.												
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>1</td></tr> <tr> <td>(Practical work)</td><td>1</td></tr> <tr> <td>(Activity in class)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Report)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	1	(Practical work)	1	(Activity in class)	1	(Written exam)	1	(Report)	1
Aktivnost	ECTS												
(Classes attendance)	1												
(Practical work)	1												
(Activity in class)	1												
(Written exam)	1												
(Report)	1												
Remark	This course can be used for final thesis theme												
Prerequisites:	No prerequisites.												
ISVU equivalents:	22324;												

Code WEB/ISVU	23463/155972	ECTS	5.0	Academic year	2018/2019
Name	Construction Technology				
Status	5th semester - Building Construction (Redovni graditeljstvo) - obligatory course5th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course5th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course5th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+0+20) 90
Teachers	Lectures:2. v.predavač Boris Uremović dipl.ing.građ. Auditory exercises:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ Auditory exercises: Nina Šantek struč.spec.ing.aedif., predavač Auditory exercises:v.predavač Boris Uremović dipl.ing.građ. Auditory exercises: Sanela Vojnović mag.ing.aedif Construction exercises:prof.dr.sc. Vjeran Mlinarić dipl.ing.građ Construction exercises: Nina Šantek struč.spec.ing.aedif., predavač Construction exercises: Sanela Vojnović mag.ing.aedif				
Course objectives	Students will learn how to recognise problems in the field of concrete works, scaffolding, formworks, and assembly work, and to independently solve technological problems on the construction site. They will also be able to properly communicate with designers and other participants in the construction process.				
Learning outcomes:	1.analyze design documents for construction work. Level:6 2.formulate key technological processes. Level:6,7 3.draw technological process maps. Level:6 4.organize work processes for realization of construction works. Level:6,7 5.propose optimum structures for the realization of works. Level:6,7 6.manage technological processes during realization of works. Level:6,7 7.solve technological issues relating to the realization of construction work. Level:6				
Methods of carrying out lectures	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.				
Methods of carrying out auditory exercises	Problems are solved on the blackboard.				
How construction exercises are held	Students independently solve problems defined by the lecturer.				
Course content lectures	1.Technique, technology and preparations for concrete work, 2h, Learning outcomes:1,2,3 2.Production, transport and placement of fresh concrete, 2h, Learning outcomes:4,5 3.Production, transport and placement of fresh concrete, 2h, Learning outcomes:4,5 4.Scaffolds and formworks, 2h, Learning outcomes:4,5,6 5.Scaffolds and formworks, 2h, Learning outcomes:4,5,6 6.Scaffolds and formworks, 2h, Learning outcomes:4,5,6 7.Selecting and planning formwork systems and scaffolds, 2h, Learning outcomes:4,5,7 8.Technique and technology of manufacturing concrete products, blocks and small elements (manufacturing plants, systems, areas and lines), 2h, Learning outcomes:4,5,7 9.Equipment for installation of concrete products, 2h, Learning outcomes:4,5,6,7 10.Technique and technology for manufacturing prefabricated elements and assemblies , 2h, Learning outcomes:4,5,6 11.Technique and technology for manufacturing prefabricated elements and assemblies , 2h, Learning outcomes:4,5,6 12.Machinery, equipment and devices for the installation of elements and assemblies, 2h, Learning outcomes:4,5,7 13.Machinery, equipment and devices for the installation of elements and assemblies, 2h, Learning outcomes:4,5,7 14.Technology used for the assembly of buildings, halls and bridges, 2h, Learning outcomes:5,7 15.Selecting and planning application of prefabricated systems, 2h, Learning outcomes:5,7				
Course content auditory	1.Sliding formwork calculation and dimensioning, 2h, Learning outcomes:1,5,7 2.Calculating disposition of formwork system along specified wall and ceiling areas, 2h, Learning outcomes:5,7 3.Calculating and dimensioning transport of concrete to a construction site, 2h, Learning outcomes:5,7 4.Assembly crane selection and dimensioning, 2h, Learning outcomes:5,7 5.Calculation of concrete pressure acting on horizontal and vertical formwork, 1h, Learning outcomes:1,7 6.no classes, 2h 7.no classes, 2h 8.no classes, 2h 9.no classes, 2h 10.no classes, 2h 11.no classes, 2h 12.no classes, 2h 13.no classes, 2h 14.no classes, 2h 15.no classes, 2h				
Course content constructures	1.no classes, 2h 2.no classes, 2h 3.no classes, 2h 4.no classes, 2h 5.no classes, 1h Preparation of project assignment: 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., 1h, Learning outcomes:1,5,7 6.Preparation of project assignment: 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., 2h, Learning outcomes:1,5,7 7.Preparation of project assignment: 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., 2h, Learning outcomes:1,5,7 8.Preparation of project assignment: 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., 2h, Learning outcomes:1,5,7 9.Preparation of project assignment: 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., 2h, Learning outcomes:1,5,7 10.Preparation of project assignment: 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., 2h, Learning outcomes:1,5,7 11.Preparation of project assignment: 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., 2h, Learning outcomes:1,5,7 12.Preparation of project assignment: 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., 2h, Learning outcomes:1,5,7 13.Preparation of project assignment: 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., 2h, Learning outcomes:1,5,7 14. Students also calculate concrete pressure within the formwork, determine consumption of materials and components, and calculate cost per unit installed, 2h, Learning outcomes:1,5,7 15. Students also calculate concrete pressure within the formwork, determine consumption of materials and components, and calculate cost per unit installed, 2h, Learning outcomes:1,5,7						
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Portable overhead projector Video equipment						
Exam literature	Basic literature: 1. Prof. Vjeran Mlinarić : predavanja objavljena na stranici predmeta 2. Gorazd Bučar: Tesarski, armirački i betonski radovi na gradilištu, Građevinski fakultet J.J. Strossmayera u Osijeku 3. Rudolf Lončarić: Organizacija izvedbe graditeljskih projekata, HDGI, 1995 4. bilješke s predavanja i materijali dobiveni na predavanjima I vježbama (uvezana predavanja komplet) Additional literature: 1. www.grad.hr- djelatnici - dr.sci. Zdravko Linarić Dokumenti raspoloživi za download : Postrojenja za proizvodnju gradiva, I.dio, Tvornice betona (betonare) Izbor strojeva i planiranje strojnog rada u građenju, 2. www.grad.hr. Tehnologija građenja visokogradnja - predavanja 3. www.grad.hr Tehnologija građenja 2 - predavanja						
Students obligations	maximum of 3 absences from exercises						
Knowledge evaluation during semester	Kolokvij, teorijska pitanja#2#100#25\$Programski zadatak#1#0#100\$						
Knowledge evaluation after semester	assignment (students must provide explications relating to their assignments) tests 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)						
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Project)</td><td>2</td></tr> <tr> <td>(Written exam)</td><td>3</td></tr> </table>	Aktivnost	ECTS	(Project)	2	(Written exam)	3
Aktivnost	ECTS						
(Project)	2						
(Written exam)	3						
Remark	This course can be used for final thesis theme						
Prerequisites:	Students cannot pass this course unless they have passed Građevinski strojevi Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have completed Građevinski strojevi						
ISVU equivalents:	22362;						
Proposal made by	v.predavač Boris Uremović dipl.ing.grad., 17.9.2018						



Code WEB/ISVU	23448/155949	ECTS	3.0	Academic year	2018/2019
Name	Descriptive Geometry in Civil Engineering I				
Status	1st semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (7+0+0+8) 60
Teachers	Lectures:1. dr.sc. Mirela Katić-Žlepalo prof.mat. Lectures:2. Ivana Božić Dragun dipl.prof.mat. Auditory exercises: Ivana Božić Dragun dipl.prof.mat. Auditory exercises:dr.sc. Mirela Katić-Žlepalo prof.mat. Construction exercises: Ivana Božić Dragun dipl.prof.mat. Construction exercises:dr.sc. Mirela Katić-Žlepalo prof.mat.				
Course objectives	Development of students spatial perception, creative thinking, and spatial problem solving using structural method				
Learning outcomes:	1.develop spatial perception. Level:6,7 2.solve spatial problem by a structural method. Level:6 3.draw a three-dimensional object on a two-dimensional drawing. Level:6 4.draw orthogonal projection of geometric objects using the Monges method. Level:6 5.analyse stereometric relations in orthogonal projection of geometric bodies. Level:6 6.make a three-dimensional sketch based on orthogonal projections given on a two-dimensional drawing. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Other PowerPoint step-by-step presentations.				
Methods of carrying out auditory exercises	Other Problems are solved at the blackboard or on computer.				
How construction exercises are held	Other Each student designs his drawing on paper. Lecturers corrections are obliged.				
Course content lectures	1.Introduction to Monges method. Projections of a point and a line-segment., 1h, Learning outcomes:1,3,4 2.Projections of line. Points of intersection of line. Inclined angles of line. Two lines. Projections of plane figures., 1h, Learning outcomes:1,3,4 3.Projections of plane. Point and line in plane., 1h, Learning outcomes:1,3,4 4.Constructing plane traces. Two planes. Intersection of line and plane. Perpendicularity., 1h, Learning outcomes:1,3,4 5.Side view., 1h, Learning outcomes:1,3,4 6.Projections of plane shapes. Shapes in projecting plane., 1h, Learning outcomes:1,3,4 7.Shape in oblique plane. Rotation of plane. Perspectival affinity., 1h, Learning outcomes:1,3,4 8.First preliminary exam., 1h, Learning outcomes:1,3,4 9.Projections of circle. Circle in projecting and in oblique plane. Construction of ellipse., 1h, Learning outcomes:1,3,4 10.Projections of geometrical solids. Regular polyhedra., 1h, Learning outcomes:1,2,3,4,5,6 11.Projections of geometrical solids with base in projecting plane., 1h, Learning outcomes:1,2,3,4,5,6 12.Projections of geometrical solids with base in oblique plane., 1h, Learning outcomes:1,2,3,4,5,6 13.About surfaces of 2nd order. Surface sections., 1h, Learning outcomes:1,2,3,4,5,6 14.Cone sections., 1h, Learning outcomes:1,2,3,4,5,6 15.Second preliminary exam., 1h, Learning outcomes:1,2,3,4,5,6				
Course content auditory	1.Points, lines, planes. Designing regular polygons., 1h, Learning outcomes:1,3,4 2.Monges method. Orthogonal projections of point, line-segment, line., 1h, Learning outcomes:1,3,4 3.Two lines. Plane. Point, line and shape in plane., 1h, Learning outcomes:1,3,4 4.Constructing plane traces. Two planes. Intersection point of line and plane., 1h, Learning outcomes:1,3,4 5.- 6.Perpendicularity. Side view., 1h, Learning outcomes:1,3,4 7.- 8.Projections of shapes. Shapes in projecting plane., 1h, Learning outcomes:1,3,4 9.Projections of shapes in oblique plane. Affinity., 1h, Learning outcomes:1,3,4 10.- 11.- 12.- 13.- 14.- 15.-				
Course content constructures	1.- 2.- 3.- 4.- 5.Dealing with spatial relations., 1h, Learning outcomes:1,3,4 6.- 7.Dealing with metrical method., 1h, Learning outcomes:1,3,4 8.- 9.- 10.Design of projections of geometric shapes., 1h, Learning outcomes:1,3,4 11.Design of projections of geometric solids., 1h, Learning outcomes:1,2,3,4,5,6 12.Design of projections of geometric solids with base in oblique plane., 1h, Learning outcomes:1,2,3,4,5,6 13.Students individual work - projections of geometric solids., 1h, Learning outcomes:1,2,3,4,5,6 14.Students individual work - projections of geometric solids., 1h, Learning outcomes:1,2,3,4,5,6 15.Students individual work - projections of geometric solids., 1h, Learning outcomes:1,2,3,4,5,6				



Required materials	Basic: classroom, blackboard, chalk... Overhead projector	
Exam literature	Basic literature: 1. K. Horvatić-Baltasar, I. Babić: Nacrtna geometrija, SAND d.o.o., Zagreb, 1997. Additional literature: 2. I. Babić, S. Gorjanc, A. Sliepčević, V. Szivovicza: Nacrtna geometrija-zadaci, HDGG, Zagreb, 2011. 3. M. Katić Žlepalo, I. Božić: Nacrtna geometrija u graditeljstvu 1 - skripta za vježbe 4. V. Szivovicza, E. Jurkin Deskriptivna geometrija CD, Zagreb, 2005. 5. Linkovi na materijale na web: http://moj.tvz.hr/index.php?pred=18103	
Students obligations	Regular attendance. Student's task (design of geometrical solid). Homework. Two preliminary exams. Both pre-exams should be completed with minimum 40% score to be allowed to take a final exam.	
Knowledge evaluation during semester	Two preliminary exams. Both pre-exams should be completed with minimum 70% in order to be exempt from the final exam.	
Knowledge evaluation after semester	Written exam. Oral exam.	
Student activities:	Aktivnost (Written exam)	ECTS 3
Remark	This course can not be used for final thesis theme	
Prerequisites:	No prerequisites.	
ISVU equivalents:	38169;39048;	

Code WEB/ISVU	23937/184741	ECTS	3.0	Academic year	2018/2019
Name	Descriptive Geometry in Civil Engineering II				
Status	2nd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+30 (8+0+0+22) 45
Teachers	Lectures:1. dr.sc. Mirela Katić-Žlepalo prof.mat. Lectures:2. Ivana Božić Dragun dipl.prof.mat. Auditory exercises: Ivana Božić Dragun dipl.prof.mat. Auditory exercises:dr.sc. Mirela Katić-Žlepalo prof.mat. Construction exercises: Ivana Božić Dragun dipl.prof.mat. Construction exercises:dr.sc. Mirela Katić-Žlepalo prof.mat.				
Course objectives	Students will acquire spatial perception and creative thinking ability, and be able to solve spatial problems using a structural method.				
Learning outcomes:	1.develop spatial perception. Level:6,7 2.solve structural problem using a structural method. Level:6 3.draw a three-dimensional object on a two-dimensional drawing using the oblique axonometry method. Level:6 4.draw a three-dimensional object on a two-dimensional drawing using the oblique projection method. Level:6 5.draw intersection of the plane and geometrical body. Level:6 6.differentiate section curves in the intersection of the plane and geometrical body. Level:6 7.find solution for covering the facility with roof planes. Level:6 8.draw simple geometrical objects and tasks using elevation projection. Level:6 9.solve layout plan for earthworks along the roadway using elevation projection, include accessory facilities (embankment, cutting, canal). Level:6				
Methods of carrying out lectures	Ex cathedra teaching Other Solving tasks on the blackboard. PowerPoint step-by-step presentations.				
Methods of carrying out auditory exercises	Other Tasks are solved on the blackboard, students are proactive.				
How construction exercises are held	Computer simulations Other Students solve their tasks individually, with the help from teacher.				
Course content lectures	1.Intersections of cylinder., 1h, Learning outcomes:1,2,5,6 2.Axonometry of points, line-segments, cone, object. Rytz method., 1h, Learning outcomes:1,3 3.Intersection of cone in axonometry., 1h, Learning outcomes:1,3,5,6 4.Oblique projection of point, line-segment, geometrical solid, object., 1h, Learning outcomes:1,4 5.Roofing. Plan view of roof., 1h, Learning outcomes:7 6.Roofing. Front view of roof., 1h, Learning outcomes:7 7.Projection with elevations. Line and plane in elevation projection., 1h, Learning outcomes:8 8.First preliminary exam., 1h 9.Elementary tasks in elevation projection., 1h, Learning outcomes:8 10.Topographic surfaces. Intersection of topographic surface with plane., 1h, Learning outcomes:8 11.Structural solution for an earthwork situation using the embankment and cutting plane placing method - horizontal straight traffic route., 1h, Learning outcomes:9 12.Structural solution for an earthwork situation using the embankment and cutting plane placing method - horizontal circular curved traffic route., 1h, Learning outcomes:9 13.Structural solution for an earthwork situation using the embankment and cutting plane placing method - slope straight traffic route., 1h, Learning outcomes:9 14.Traffic routes in two levels. Crossroads of a road and a railway track., 1h, Learning outcomes:9 15.Second preliminary exam., 1h				
Course content auditory	1.Intersections of cone with three projecting planes. Intersections of cylinder., 2h, Learning outcomes:1,2,5,6 2.Intersections of sphere. Axonometry of cone intersection., 2h, Learning outcomes:1,2,3,5,6 3.- 4.- 5.Axonometry of an object. Oblique projection of wood connections., 2h, Learning outcomes:1,2,3,4 6.- 7.- 8.- 9.- 10.- 11.Elevation projection - theoretical tasks., 2h, Learning outcomes:8 12.- 13.- 14.- 15.-				
Course content constructs	1.- 2.- 3.1st program - intersections of cone or cylinder by planes - Monge method., 2h, Learning outcomes:1,2,5,6 4.1st program - intersections of cone or cylinder by planes - axonometric method., 2h, Learning outcomes:1,2,3,5,6 5.- 6.2nd program - axonometry of an object., 2h, Learning outcomes:1,2,3 7.2nd program - oblique projection of wood connections., 2h, Learning outcomes:1,2,4 8.3rd program - roof - computer classroom - AutoCAD., 2h, Learning outcomes:7 9.3rd program - roof - top view - computer classroom - AutoCAD., 2h, Learning outcomes:7				

	10.3rd program - roof - front view - computer classroom - AutoCAD., 2h, Learning outcomes:7 11.- 12.Structural solution for an earthwork situation using the embankment and cutting plane placing method., 2h, Learning outcomes:8,9 13.4th program - earthwork and traffic routes using contour method., 2h, Learning outcomes:8,9 14.4th program - earthwork and traffic routes using contour method., 2h, Learning outcomes:8,9 15.4th program - earthwork and traffic routes using contour method., 2h, Learning outcomes:8,9
Required materials	Basic: classroom, blackboard, chalk... Overhead projector Students solve their tasks individually, with the help from teacher.
Exam literature	Obavezna literatura: 1) I. Babić, S. Gorjanc, A. Sliepčević, V. Szivovica: Nacrtna geometrija-zadaci, HDGG, Zagreb, 2011. Dopunska literatura: 2) K. Horvatić-Baltasar, I. Babić: Nacrtna geometrija, SAND d.o.o., Zagreb, 1997. 3) V. Szivovica, E. Jurkin Deskriptivna geometrija, CD, Zagreb, 2005. Linkovi na materijale na web: http://moj.tvz.hr/index.php?pred=18366
Students obligations	4 programs (student's individual tasks). 3 homeworks. Both pre-exams should be completed with minimum 40% score to be allowed to take final exam. Regular attendance.
Knowledge evaluation during semester	Two preliminary exams. Both pre-exams should be completed with minimum 70% in order to be exempt from the final exam.
Knowledge evaluation after semester	Written exam. Oral exam.
Student activities:	Aktivnost (Written exam) ECTS 3
Remark	This course can not be used for final thesis theme
Prerequisites:	Students cannot pass this course unless they have passed Nacrtna geometrija u graditeljstvu I Students cannot enroll in this course unless they have completed Nacrtna geometrija u graditeljstvu I
ISVU equivalents:	22339;38170;155950;

Code WEB/ISVU	22880/22335	ECTS	2.0	Academic year	2018/2019
Name	Elementary Geology				
Status	2nd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (15+0+0+0) 30
Teachers	Lectures:1. dr.sc. Tatjana Vlahović prof.v.škole Auditory exercises:dr.sc. Tatjana Vlahović prof.v.škole				
Course objectives	Acquiring 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 construction work.				
Learning outcomes:	1.anticipate geological problems in civil engineering. Level:6,7 2.differentiate between individual types of rocks and minerals. Level:6 3.specify different types of geological structures. Level:6 4.comment on specific ground-surface processes and their consequences. Level:6 5.define the ways in which geological processes influence construction of engineering structures. Level:6,7 6.analyse and interpret geological maps. Level:6 7.propose the use of rock as a natural construction material. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other 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.				
Methods of carrying out auditory exercises	Group problem solving Other 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 content lectures	1.Introduction to geology. Composition of the Earth. Lithosphere. Minerals. Crystals. Physical and chemical properties of minerals., 2h, Learning outcomes:1 2.Main petrogenic minerals (silicates and non-silicates) composition and systematisation, 2h, Learning outcomes:2 3. Igneous rocks: structures, textures, systematisation, 2h, Learning outcomes:2 4.Metamorphic rocks: origin of metamorphic rocks, 2h, Learning outcomes:2 5.Sedimentary rocks: structures, textures, systematisation (clastites and carbonates), 2h, Learning outcomes:2,3 6.Geologic time. Determining age of rocks. Chronostratigraphic and lithostratigraphic classification of geologic past, 2h, Learning outcomes:6 7.Geologic structures. Primary and secondary structures. Secondary structures: joints, faults fault systems and folds descriptive characteristics, classification and impact on the stability of slopes, 2h, Learning outcomes:3 8.Hydrogeology the role in civil engineering. Hydrological cycle. Ground water porosity and permeability of the rocks, movement of ground water, physicochemical properties of ground water; hydrogeological function of rocks, classification of aquifers, classification of springs, 2h, Learning outcomes:4 9.Hydrogeology the role in civil engineering. Hydrological cycle. Ground water porosity and permeability of the rocks, movement of ground water, physicochemical properties of ground water; hydrogeological function of rocks, classification of aquifers, classification of springs, 2h, Learning outcomes:4 10.Hydrogeology the role in civil engineering. Hydrological cycle. Ground water porosity and permeability of the rocks, movement of ground water, physicochemical properties of ground water; hydrogeological function of rocks, classification of aquifers, classification of springs, 2h, Learning outcomes:4 11.Geology and hydrogeology of karst. Weathering processes in carbonate rocks. Morphological features of karst: sinkholes, ponors, caves and pits, 2h, Learning outcomes:4 12.Geology and hydrogeology of karst. Weathering processes in carbonate rocks. Morphological features of karst: sinkholes, ponors, caves and pits, 2h, Learning outcomes:4 13.Basic hydrogeological investigations in civil engineering methodology and content of hydrogeological investigations, hydrogeological investigations for realization of engineering and other structures drying of bottom outlets, Hydraulic structures, investigation of ground water for water supply, 2h, Learning outcomes:5 14. Role of engineering geology in civil engineering. Classification of rocks: geological description, engineering properties of rocks and engineering problems. Geodynamic processes., 2h, Learning outcomes:5,6 15. Role of engineering geology in civil engineering. Classification of rocks: geological description, engineering properties of rocks and engineering problems. Geodynamic processes., 2h, Learning outcomes:5,6				
Course content auditory	1.Determination of rocks igneous, metamorphic und sedimentary rocks, 2h, Learning outcomes:2 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, 2h, Learning outcomes:6 3. Interpretation of geologic structures, 2h, Learning outcomes:3 4.Pumping test and determination of hydrogeological parameters from the pumping test data, 2h, Learning outcomes:4,5 5.Pumping test and determination of hydrogeological parameters from the pumping test data, 2h, Learning outcomes:4,5 6.Typical examples of morphologic features and hydrogeological structures in karst terrains of Croatia, 2h, Learning outcomes:4,5 7.Geodynamic processes: Risk and estimation of geohazards. Earthquakes and related processes. Volcanism. Landslides. Subsidence. Expanding soil. Processes on the coast, 2h, Learning outcomes:4,5 8.Geodynamic processes: Risk and estimation of geohazards. Earthquakes and related processes. Volcanism. Landslides. Subsidence. Expanding soil. Processes on the coast, 2h, Learning outcomes:4,5 9. Landslide examples in Croatia and worldwide, 2h, Learning outcomes:5,7				

	10. Basic engineering geological investigations in civil engineering: elements and type of investigations. Tunnels. Hydraulic structures. Roads. Geophysical investigations. Exploratory drilling, 2h, Learning outcomes: 5,7 11. Basic engineering geological investigations in civil engineering: elements and type of investigations. Tunnels. Hydraulic structures. Roads. Geophysical investigations. Exploratory drilling, 2h, Learning outcomes: 5,7 12. Basic engineering geological investigations in civil engineering: elements and type of investigations. Tunnels. Hydraulic structures. Roads. Geophysical investigations. Exploratory drilling, 2h, Learning outcomes: 5,7 13. Environmental Geology. General aspects of exploitation of mineral deposits. Pollution and protection of ground water. Typical examples from Croatia and existing legislation, 2h, Learning outcomes: 7 14. Environmental Geology. General aspects of exploitation of mineral deposits. Pollution and protection of ground water. Typical examples from Croatia and existing legislation, 2h, Learning outcomes: 7 15. Visit to interesting hydrogeological/engineering-geological structures. Visit to the Faculty of Mining, Geology and Petroleum Engineering, 2h, Learning outcomes: 1
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment
Exam literature	Obvezna literatura : 1. Vlahović, T. (2010): Geologija za građevinare. Sveučilište u Splitu. Građevinsko-arhitektonski fakultet, Split. Materijali dobiveni na predavanjima i vježbama. Dopunska literatura: 1. Šestanović, S. (1990): Osnove geologije i petrografije. Primjena u građevinarstvu. 2. izmijenjeno i dopunjeno izdanje, Školska knjiga, Zagreb. 2. Plummer, C.C., McGary, D., Carlson, D.H (1999): Physical geology. 8th Edition, WCB, cGraw-Hill Publishers, Boston Toronto. 3. Domenico, P.A. Schwartz, F.W. (1997): Physical and chemical hydrogeology. J. Wiley sons. 4. Goodman, R.E. (1993): Engineering geology. Rock in engineering construction. John Wiley and So., New York, 412 p. 5. Tišljar, J. (1999): Petrologija s osnovama mineralogije. 1-212, Udžbenici Sveučilišta u Zagrebu, RGN fakultet, Zagreb. 6. Vrkljan, Maja (2001): Mineralogija i petrologija osnove i primjena. 1-207, Udžbenici Sveučilišta u Zagrebu, RGN fakultet, Zagreb. 7. Šestanović, S. (1993): Osnove inženjerske geologije. Primjena u graditeljstvu. Geing, Split.
Students obligations	maximum of 3 absences from exercises
Knowledge evaluation during semester	Redovitost pohaa#10#0#50\$Kolokvij, teorijska pitanja#2#100#50\$
Knowledge evaluation after semester	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
Remark	This course can not be used for final thesis theme
Prerequisites:	No prerequisites.

Code WEB/ISVU	23917/184644	ECTS	6.0	Academic year	2018/2019
Name	Engineering Mechanics				
Status	1st semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				45+30 (24+0+0+6) 105
Teachers	Lectures:1. mr.sc. Željko Lebo v. pred. Lectures:2. dr.sc. Dalibor Gelo mag.ing.aedif. Auditory exercises:mr.sc. Jure Galić predavač Auditory exercises:dr.sc. Dalibor Gelo mag.ing.aedif. Auditory exercises:mr.sc. Željko Lebo v. pred. Construction exercises:mr.sc. Jure Galić predavač Construction exercises:dr.sc. Dalibor Gelo mag.ing.aedif. Construction exercises:mr.sc. Željko Lebo v. pred.				
Course objectives	Acquiring basic knowledge in structural mechanics, with an emphasis on its use in civil engineering as a basis for proper understanding of professional courses				
Learning outcomes:	1.check balance of a material point and body. Level:6 2.calculate required balancing forces and moments for a material point and body subjected to load. Level:6 3.compare state of balance of material points and bodies. Level:6,7 4.calculate internal forces in a straight member. Level:6 5.draw diagrams of internal forces of a straight member. Level:6 6.calculate cross-sectional geometrical properties of a member. Level:6 7.analyse stress field, namely the biaxial homogeneous stress field of a straight member. Level:6 8.calculate extreme stress values for given forces within the members cross-section. Level:6 9.analyse state of stress needed to ensure mechanical safety and stability of a straight member. Level:6 10.evaluate strain field of a straight member. Level:6 11.Predict friction force. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Modelling Discussion Questions and answers 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.				
Methods of carrying out auditory exercises	Group problem solving problem solving with active participation of students				
How construction exercises are held	Group problem solving				
Course content lectures	1.Introduction to Technical mechanics. Basic laws and methods. International System of Units., 3h, Learning outcomes:1 2.The concept of force and moments. Force and moment definition and representation., 3h, Learning outcomes:1 3.Equilibrium forces, the material points and body, 3h, Learning outcomes:2,3 4.Equilibrium point and bodies . Equilibrium of bodies in plane., 3h, Learning outcomes:2,3 5.First Colloquium, 2h, Learning outcomes:1,2,3 6.Equilibrium of bar element. The concept of internal forces., 3h, Learning outcomes:2,3,4 7.Linear bar element. Internal forces in linear bar element., 3h, Learning outcomes:2,3,4,5 8.Analyze and drawing of internal forces diagrams., 3h, Learning outcomes:2,3,4,5 9.Differential relation between internal forces and external forces. Concept of concentrated forces and moments., 3h, Learning outcomes:2,3,4,5 10.Mechanics of the solid body. Concept of stress, displacements and deformation. , 3h, Learning outcomes:2,3,4,5 11.Second Colloquium, 3h, Learning outcomes:6,7 12.Deformation fields. Relation between stress and deformations. Hooke low. Biaxial stress fields. Principal stress. Maximal shear deformations., 3h, Learning outcomes:6,7,8,9,10 13.Basic assumptions of bar element mechanics. Relation between internal forces and deformations on the linear bar element. Concept limit stress. , 3h, Learning outcomes:7,8,9,10 14.Friction., 3h, Learning outcomes:11 15.Third Colloquium, 3h, Learning outcomes:6,7,8,9,10,11				
Course content auditory	1.Equilibrium of point in plane., 2h, Learning outcomes:1 2.Equilibrium of bodies in plane., 2h, Learning outcomes:2,3 3.Equilibrium of bodies in plane. Ritter and Culmann method., 2h, Learning outcomes:2,3 4.No classes., 2h 5.Internal forces., 2h, Learning outcomes:4 6.Internal forces., 2h, Learning outcomes:4 7.Internal forces., 2h, Learning outcomes:4 8.Internal forces., 2h, Learning outcomes:4 9.No classes., 2h 10.Center of gravity and moment of inertia., 2h, Learning outcomes:6 11.Moment of inertia, static moment, Steiner, 2h, Learning outcomes:6,7,8,9,10 12.Mohr circles, 2h, Learning outcomes:6,7,8,9,10 13.Friction, 2h, Learning outcomes:11 14.No classes., 2h 15.Preparations for the final exam., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11				

Course content constructs	1.No classes., 2h 2.No classes., 2h 3.No classes., 2h 4.Constructive exercises for the first colloquium., 2h, Learning outcomes:1,2,3 5.No classes., 2h 6.No classes., 2h 7.No classes., 2h 8.No classes., 2h 9.Constructive exercises for the second colloquium., 2h, Learning outcomes:5 10.No classes., 2h 11.No classes., 2h 12.No classes., 2h 13.No classes., 2h 14.Constructive exercises for the third colloquium., 2h, Learning outcomes:6,7,8,9,10 15.No classes., 2h	
Required materials	Basic: classroom, blackboard, chalk... Overhead projector Problem solving with active participation of students	
Exam literature	Obavezna: 1. Ž. Lebo: Separati predavanja na web-u 2. H. Werner: Tehnička mehanika, skripta, Zagreb, 1986. 2. Z. Despot: Separati predavanja. 3. V. Šimić: Otpornost materijala I., Školska knjiga, Zagreb, 1992. 4. H. Werner: Mehanika I., HSGI, 2007. Additional literature: 1. V. Šimić :Otpornost materijala II., Školska knjiga, Zagreb, 1995. 2. Lj. Kopričanec-Matijevac, Zbirka zadataka iz Tehničke mehanike skripta, na mrežnim stranicama predmeta i u kopiraonici 3. H. Werner: Tehnička mehanika - separati za vježbe- u kopiraonici 4. Riješeni primjeri kolokvija i ispitnih zadataka na mrežnim stranicama predmeta	
Students obligations	Class attendance. Minimum of 75 points in three exams.	
Knowledge evaluation during semester	Class attendance. Exams: numerical examples, theoretical questions. Minimum 180 points from possible 300 in three colloquiums.	
Knowledge evaluation after semester	Written and werbal exam	
Student activities:	Aktivnost (Classes attendance) (Constantly tested knowledge) (Written exam) (Oral exam)	ECTS 2 2 1 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	No prerequisites.	
ISVU equivalents:	22323;	
Proposal made by	mr.sc. Željko Lebo v. pred., dr.sc., Dalibor Gelo mag.ing.aedif.	



Code WEB/ISVU	23351/147431	ECTS	4.0	Academic year	2018/2019
Name	English language I				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (30+0+0+0) 60
Teachers	Lectures:1. dr.sc. Ivana Špiranec prof. visoke škole Auditory exercises:dr.sc. Ivana Špiranec prof. visoke škole				
Course objectives	The main objective is to develop the capability to understand technical texts, find relevant information, and to teach students how to submit reports on the text read.				
Learning outcomes:	1.use acquired ability to properly consult technical texts and find relevant information while reading professional and research texts. Level: 2.demonstrate knowledge of technical terminology and efficient use of this terminology in communication. Level: 3.demonstrate proficiency in the use of grammatical structures that are typical for technical texts. Level: 4.interpretirati pročitani tehnički tekst te izložiti svoje mišljenje o pročitanoj. Level: 5.improve proficiency in the use of all four language skills. Level: 6.demonstrate efficient use of monolingual and bilingual dictionaries. Level: 7.translate professional papers from English language to Croatian language. Level: 8.show knowledge of collocations in English language, i.e. structures in which culturology differences between the English and Croatian languages can clearly be seen. Level:				
Methods of carrying out lectures	Ex cathedra teaching Discussion				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Interactive problem solving Workshop				
Course content lectures	1.ESP- English for specific purposes- aims English as a lingua franca, 2h, Learning outcomes:1,5,8 2.Word formation - Prefixes and suffixes, 2h, Learning outcomes:2 3.Tense review, 2h, Learning outcomes:3 4.Collocations- definition and examples, Cultural differences, 2h, Learning outcomes:2,7,8 5.Watching video clips career options in civil engineering - discussion Listening and speaking skill, 2h, Learning outcomes:1,5 6.Nouns with irregular plural Vocab building - people involved in building, types of works in building, tools and instruments, vehicles , 2h, Learning outcomes:5 7.Who needs a degree? Relevant vocabulary, discussion, 2h, Learning outcomes:1 8.Reading and listening skill theoretical prerequisites, 2h, Learning outcomes:1,5 9.The most impressive structures in the world, 2h, Learning outcomes:4 10.Passive voice, 2h, Learning outcomes:3 11.Energy renewable and non-renewable, 2h, Learning outcomes:1,2,7 12.Prepositions of time and place, verbs + prepositions, adjectives + prepositions, 2h, Learning outcomes:3 13.What is a fluid? T/F questions, discussion, quiz, 2h, Learning outcomes:1,4 14.Independent learning- developing reading and listening skill, working with dictionaries, 2h, Learning outcomes:5,6 15.Preparation for the second pre-exam, tasks, 2h, Learning outcomes:4				
Course content auditory	1.Facts about English language. Reading skill and related vocabulary, 2h, Learning outcomes:1,4,7,8 2.Prefixes and suffixes- practice, Working with a monolingual dictionary, 2h, Learning outcomes:2,6,7,8 3.Tenses- practice. Famous inventors and inventions, 2h, Learning outcomes:3,4,5 4.Working with a dictionary of collocations. Reading skill, speaking skill., 2h, Learning outcomes:1,5,6 5.Speaking about students, 2h, Learning outcomes:2,5,6,7,8 6.Speaking skill - negotiations., 2h, Learning outcomes:2,5,8 7.What is the coolest civil engineering subdivision?, 2h, Learning outcomes:1,4,5 8.First pre-exam. , 2h, Learning outcomes:1,2,3,4,7,8 9.Students prepare presentations about famous structures, presentation skills., 2h, Learning outcomes:5 10.Passive- exercises., 2h, Learning outcomes:2,3,8 11.Energy - related vocabulary, word building., 2h, Learning outcomes:2,4,6,7,8 12.Prepositions- exercises, Reading skill, Writing skill., 2h, Learning outcomes:3,5,8 13.Vocabulary practice. Prepositions- practice, 2h, Learning outcomes:2,8 14.Students present their portfolio to the teacher, 2h, Learning outcomes:1,2,3,4,5 15.Second pre-exam., 2h, Learning outcomes:1,2,3,6,7,8				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Video equipment				
Exam literature	Basic literature: 1. English for Civil Engineers, Špiranec, I., TVZ, Zagreb, 2010. Preporučena dopunska literatura: 1. Reading Technical English for Academic Purposes, Hercezi-Skalicki, M., Školska knjiga, Zagreb, 1993. 2. Ilustrirani rječnik arhitekture i građevinarstva, Vulelija, Z., Masmedia, Zagreb,2008. 3.Trojezični građevinski rječnik, Prager A., 2003.				



Students obligations	Regular attendance and being active in lesson, maximum 3 absences from exercises and lectures allowed.	
Knowledge evaluation during semester	Students take two pre-exams per semester. If they pass, they are exempt from the final exam. If they fail, they are obliged to take the final exam. They also have oral examination.	
Knowledge evaluation after semester	Students take final written exam as well as oral exam.	
Student activities:	Aktivnost (Written exam) (Oral exam)	ECTS 3 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	No prerequisites.	
ISVU equivalents:	39032;39047;143321;	
Proposal made by	Ivana Špiranec, PhD, senior lecturer	



Code WEB/ISVU	23352/147432	ECTS	2.0	Academic year	2018/2019
Name	English Language II				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (15+0+0+0) 30
Teachers	Lectures:1. dr.sc. Ivana Špiranec prof. visoke škole Auditory exercises:dr.sc. Ivana Špiranec prof. visoke škole				
Course objectives	Students will learn how to write a curriculum vitae and prepare a job application, how to make a presentation, and how to participate in a job interview in English language. Students will also be taught how to efficiently use various dictionaries (monolingual and bilingual), which will assist them in improving their English language skills and knowledge.				
Learning outcomes:	1.formulate resume (CV) and job application in English language. Level:6,7 2.analyse technical text by verifying hypotheses set in advance in order to motivate students to develop a critical attitude to the text. Level:6 3.prepare and present orally a specific topic after having learned basic rules for making a successful oral presentation. Level:6,7 4.write an abstract and a written report on the text read. Level:6,7 5.analyse composite words syntactically and semantically by contrasting them with Croatian translation equivalents. Level:6 6.solve grammatical structures aimed at testing phrasal verbs, passive voice, modal verbs, and conditionals, and use them more efficiently in oral communication. Level:6 7.develop language skills in professional communications and use basic business terminology. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Discussion				
Methods of carrying out auditory exercises	Discussion, brainstorming Interactive problem solving Workshop				
Course content lectures	1.BUILDING MATERIALS, KOMPARACIJA PRIDJEVA, 1h, Learning outcomes:2,5,6 2.PELJEAC BRIDGE, CAUSE AND EFFECT, 1h, Learning outcomes:2,5,6 3.BRIDGES- VOCABULARY, COMPOUNDS 1, 1h, Learning outcomes:2,5 4.SUSTAINABLE BUILDING - TEXT ANALYSIS, VOCABULARY, COMPOUNDS 2, 1h, Learning outcomes:2,4,5 5.TRAFFIC ROUTES - ARTICLE, VOCABULARY, PHRASAL VERBS 1, 1h, Learning outcomes:2,4,6 6.RISK IN CIVIL ENGINEERING, PHRASAL VERBS 2, 1h, Learning outcomes:2,6,7 7.EARTHQUAKE ENGINEERING, VOCABULARY, 1h, Learning outcomes:2,3 8.ECO-CITIES, 1h, Learning outcomes:2,3,4 9.RAILROADS- TEXT ANALYSIS, 1h, Learning outcomes:2,4 10.MODAL VERBS, 1h, Learning outcomes:6 11.TECH-SAVV YOUTHS AND ENGINEERING, 1h, Learning outcomes:2,4 12.COMPANY PROFILE, IF CLAUSES 1, 1h, Learning outcomes:3,7 13.MOTIVATION IN WORKPLACE, IF CLAUSES 2, 1h, Learning outcomes:2,5,7 14.APPLYING FOR A JOB, WRITING A CV, 1h, Learning outcomes:1,7 15.GIVING PRESENTATIONS, 1h, Learning outcomes:3,7				
Course content auditory	1.MATERIALS, COMPARISON OF ADJECTIVES, 1h, Learning outcomes:3,5 2.EXPRESSING CAUSE-EFFECT RELATIONS, VOCABULARY- MATERIALS, 1h, Learning outcomes:2,5,6 3.BRIDGES- VOCABULARY, COMPOUNDS, 1h, Learning outcomes:2,5 4.TEXT ANALYSIS, COMPOUNDS, 1h, Learning outcomes:2,4,5 5.PHRASAL VERBS, TERMINOLOGY- TRAFFIC ROUTES, 1h, Learning outcomes:2,4,6 6.PHRASAL VERBS, TERMINOLOGY- RISK IN CIVIL ENGINEERING, 1h, Learning outcomes:2,6,7 7.EARTHQUAKE ENGINEERING- VOCABULARY, GRAMMAR- REVISION, 1h, Learning outcomes:2,6 8.FIRST PRELIMINARY EXAM , 1h, Learning outcomes:2,4,5,6 9.TEXT ANALYSIS- RAILROADS, WRITING A SUMMARY, 1h, Learning outcomes:2,4 10.MODAL VERBS, 1h, Learning outcomes:6 11.COMPUTER- VOCABULARY, MODAL VERBS, 1h, Learning outcomes:2,5,6 12.CONDITIONAL CLAUSES, 1h, Learning outcomes:3,7 13.WORK- VOCABULARY, 1h, Learning outcomes:2,7 14.APPLYING FOR A JOB, WRITING A CV, 1h, Learning outcomes:1,7 15.GIVING A PRESENTATION, DRUGI KOLOKVIJ, 1h, Learning outcomes:3,7				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment				
Exam literature	Basic literature: 1. English for Civil Engineers, Špiranec, I., TVZ, Zagreb. Preporučena dopunska literatura: 2. Reading Technical English for Academic Purposes, Hercezi-Skalicki, M., Školska knjiga, Zagreb, 1993. 2. Ilustrirani rječnik arhitekture i građevinarstva, Vulelija, Z. Masmedia, Zagreb, 2008. 2. Trojezični građevinski rječnik, Prager A., 2003.				
Students obligations	Regular attendance and being active in lesson, maximum 3 absences from exercises and lectures allowed.				



Knowledge evaluation during semester	Students take two pre-exams per semester. If they pass, they are exempt from the final exam. If they fail, they are obliged to take the final exam. They also have oral examination.	
Knowledge evaluation after semester	Students take final written exam as well as oral exam.	
Student activities:	Aktivnost (Oral exam) (Written exam)	ECTS 1 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have completed Engleski jezik u graditeljstvu I Students cannot pass this course unless they have passed Engleski jezik u graditeljstvu I	
ISVU equivalents:	22352;143322;	



Code WEB/ISVU	23467/155976	ECTS	2.0	Academic year	2018/2019
Name	Environmental Protection				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (6+0+9+0) 30
Teachers	Lectures:1. mr.sc. Gorana Čosić-Flajsig viši predavač Auditory exercises: Dejan Kovačević dipl.ing.grad. Seminar exercises: Dejan Kovačević dipl.ing.grad.				
Course objectives	teach students to recognise and evaluate significance of problems relating to environmental protection and sustainable development of renewable resources.				
Learning outcomes:	1.analyse basic dependencies of living communities, including humans, and their living and non-living environment. Level:6 2.identify the importance of sustainable development and the role of the public in environmental processes. Level:6 3.distinguish terms and constituents of environmental protection that include nature protection, protection of non-renewable resources (air, soil and water) and space protection. Level:6 4.identify processes of resource and pollution utilization and environmental impact. Level:6 5.analyze environmental assessment procedures for plans, programs and projects, and procedures for issuing permission from the idea to the building. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers 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.				
Methods of carrying out auditory exercises	Group problem solving Data mining and knowledge discovery on the Web Discussion, brainstorming Mind mapping Workshop Individual thematic units are covered together (task-solving and problem presentation).				
Methods of carrying out seminars	Group problem solving Data mining and knowledge discovery on the Web Essay writing Discussion, brainstorming Workshop 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 content lectures	1.Course plan and exams, 1h Introduction to Global Ecology, 1h, Learning outcomes:1 2.Sustainable development and public participation, 2h, Learning outcomes:1,2 3.No lessons 4.Water management, 2h, Learning outcomes:1,2,3,4 5.Nature protection, 2h, Learning outcomes:1,2,3,4 6.No lessons 7.No lessons 8.First Colloquium, 1h, Learning outcomes:1,2,3 9.No lessons 10.Climate changes, 1h, Learning outcomes:3,4,5 Protection of the ozone layer and soil protection, 1h, Learning outcomes:3,4,5 11.Waste management, 2h, Learning outcomes:3,4 12.Environmental Instruments, 2h, Learning outcomes:3,4,5 13.No lessons 14.No lessons 15.No lessons				
Course content auditory	1.No classes 2.No classes 3.Presentation of the concept seminar papers, 1h, Learning outcomes:1,2,3,4 Subdivision of seminar papers with explanation, 1h, Learning outcomes:1,2,3,4 4.No classes 5.No classes 6.No classes 7.Forms of seminar work with examples, 2h, Learning outcomes:1,2,3,4,5 8.Forms of seminar work with examples, 1h, Learning outcomes:1,2,3,4,5 9.No classes 10.No classes 11.No classes 12.No classes 13.No classes 14.Submission and review of seminar papers, 1h, Learning outcomes:1,2,3,4,5 15.No classes				
Course content seminars	1.No classes 2.No classes				

	3.No classes 4.No classes 5.No classes 6.Presentation of the concept of the topic of seminar papers, 2h, Learning outcomes:1,2,3,4,5 7.No classes 8.No classes 9.Creating seminar papers, 2h, Learning outcomes:1,2,3,4,5 10.No classes 11.No classes 12.No classes 13.Creating seminar papers, 2h, Learning outcomes:1,2,4,5 14.Second colloquium, 1h, Learning outcomes:2,3,4,5 15.Presentation of the seminar papers, 2h, Learning outcomes:1,2,3,4,5	
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment Students work in groups. 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.	
Exam literature	Interna skripta nastavnika kolegija Zaštita okoliša Glavač,V., Uvod u globalnu ekologiju, Hrvatska sveučilišna naklada, Zagreb, 2001	
Students obligations	A student who achieves at least 30 points of a semester during a semester has the right to go to the exam, which during the semester has scored less than 15 marks a year, re-enrolls the subject. The minimum number of points for exercising the right to attend the exam is 10 points at each of the colloquiums. The minimum number of points for exercising the right to attend the exam is 10 points from the seminar work.	
Knowledge evaluation during semester	During the semester, through colloquia and seminar work, the student can achieve a maximum of 60 points while the other 40 points the student earns through the compulsory final exam. A student who achieves at least 44 points of grade is released from the written part of the final exam. During the semester there are 2 regular colloquia and 1 correctional colloquium. The total of both rounds can be 2 x 21 = 42 points. A student can only fix one colloquium. Minimum 15 points (minimum 70%) from the colloquium is to release the exam on the written part of the exam. Students create seminar work in groups of 4-5 students on practical examples and topics related to the course content of Environmental Protection. Seminar work is presented in groups and brings max. 18 points, and for the exemption of the written part of the exam is 14 points.	
Knowledge evaluation after semester	. The exam is submitted as an oral and written part of the exam. An essential requirement for oral exam is the achievement of 50% and more success on the written part. The final grade of the subject is the sum of the marks obtained during the semester and the exam as a percentage of the accepted knowledge and skills, namely: 90 -100 - excellent (5) 80 - 89,9 - very good (4) 65 - 79,9 - Good (3) 50 - 64,9 - sufficient (2)	
Student activities:	Aktivnost (Constantly tested knowledge) (Oral exam)	ECTS 1 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	Students cannot pass this course unless they have passed Osnove geologije Students cannot enroll in this course unless they have passed Matematika I Students cannot enroll in this course unless they have enrolled Osnove geologije	
ISVU equivalents:	22350;	
Proposal made by	Gorana Ćosić Flajisq, MSc, Senior lecturer, 23.06.2018.	



Code WEB/ISVU	22883/22359	ECTS	2.0	Academic year	2018/2019
Name	Field Practice				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				0+30 (30+0+0+0) 30
Teachers	Auditory exercises:1. v.predavač Boris Uremović dipl.ing.građ. Auditory exercises: Zdravko Muratti Auditory exercises: Nina Šantek struč.spec.ing.aedif., predavač Auditory exercises: Domagoj Šojat struč.spec.ing.aedif. Auditory exercises: Sanela Vojnović mag.ing.aedif				
Course objectives	Students will acquire some basic practical knowledge about various technological and organizational procedures relating to the realization of work and production of on-site documents.				
Learning outcomes:	1.draw a basic schematic diagram of site organisation. Level:6 2.draw a basic schematic of production plant. Level:6 3.differentiate various construction, finishing and installation works on a construction project. Level:6 4.analyse the use of machines on the construction site. Level:6 5.manage construction site documentation. Level:6,7 6.analyse transport solutions during construction process. Level:6 7.differentiate on-site protection measures. Level:6				
Methods of carrying out auditory exercises	Students will be prepared for participation in site work and for solving practical problems on the construction site.				
Course content auditory	1.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:1,2 2.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:1,2 3.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:1,2 4.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:1,2 5.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:3,4 6.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:3,4 7.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:3,4 8.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:3,4 9.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:5,6 10.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:5,6 11.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:5,6 12.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:5,6 13.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:5,6,7 14.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:6,7 15.Preparations for field practice, learning how to prepare site diary, examples from real construction sites., 2h, Learning outcomes:6,7				
Required materials	Basic: classroom, blackboard, chalk...				
Exam literature	Basic literature: Additional literature: 1. J. Klepac: Organizacija građenja-uređenje gradilište, Sveučilište u Zagrebu, Građevinski fakultet, 1982. 2. J. Marušić: Organizacija građenja, Sveučilište u Zagrebu, 1994. 3. G. Bučar: Tesarski, armirački i betonski radovi na gradilištu, Građevinski fakultet J.J. Strossmayera u Osijeku				
Students obligations	maximum of 3 absences from exercises				
Knowledge evaluation during semester	Redovitost pohaa#1#0#100\$Seminarski rad#1#100#50\$				
Knowledge evaluation after semester	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.				
Student activities:	Aktivnost (Seminar Work)		ECTS 2		
Remark	This course can not be used for final thesis theme				
Prerequisites:	No prerequisites.				
Proposal made by	v.predavač Boris Uremović dipl.ing.građ., 17.9.2018				



Code WEB/ISVU	23471/155981	ECTS	12.0	Academic year	2018/2019
Name	Final Thesis with Field Practice				
Status	6th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				240+0 (0+0+0+0) 120
Teachers	Lectures:1. Jagoda Bodić dipl.ing.arh.				
Course objectives	Use of acquired knowledge for independent realization of practical engineering tasks				
Learning outcomes:	1.identify problem or development areas. Level:6 2.analyse achievements made in this area. Level:6 3.break down problem areas or development areas into individual components. Level:6 4.develop a proposal or solution for a problematic situation. Level:6,7 5.develop a practical solution to a problem. Level:6,7 6.define limits and generalization possibilities for the final paper. Level:6,7 7.present work results. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching				
Course content lectures	1.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 2.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 3.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 4.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 5.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 6.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 7.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 8.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 9.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 10.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 11.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 12.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 13.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 14.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 15.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7				
Required materials	Special equipment				
Exam literature	U dogovoru s mentorom				
Students obligations	maximum of 3 absences from exercises				
Knowledge evaluation during semester	Prakti ispit#1#100#100\$				
Knowledge evaluation after semester	Practical exam				
Student activities:	Aktivnost (Written exam) (Oral exam)		ECTS 6 6		
Remark	This course can not be used for final thesis theme				
Prerequisites:	Students cannot enroll in this course unless they have passed Hidrologija i hidraulika Students cannot enroll in this course unless they have completed Gospodarenje otpadom Students cannot enroll in this course unless they have completed Korištenje voda Students cannot enroll in this course unless they have completed Zaštita voda Students cannot enroll in this course unless they have completed Osnove željeznica Students cannot enroll in this course unless they have completed Kakvoća voda				
ISVU equivalents:	22388;39175;39176;65159;65395;147437;147439;147440;147441;155979;155980;155982;				



Code WEB/ISVU	23472/155982	ECTS	12.0	Academic year	2018/2019
Name	Final Thesis with Field Practice				
Status	6th semester - Building Construction (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				240+0 (0+0+0+0) 120
Teachers	Lectures:1. Jagoda Bodić dipl.ing.arh.				
Course objectives	Use of acquired knowledge for independent realization of practical engineering tasks				
Learning outcomes:	1.identify problem or development areas. Level:6 2.analyse achievements made in this area. Level:6 3.break down problem areas or development areas into individual components. Level:6 4.develop a proposal or solution for a problematic situation. Level:6,7 5.develop a practical solution to a problem. Level:6,7 6.define limits and generalization possibilities for the final paper. Level:6,7 7.present work results. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching				
Course content lectures	1.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 2.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 3.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 4.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 5.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 6.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 7.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 8.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 9.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 10.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 11.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 12.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 13.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 14.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 15.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7				
Required materials	Special equipment				
Exam literature	U dogovoru s mentorom				
Students obligations	maximum of 3 absences from exercises				
Knowledge evaluation during semester	Prakti ispit#1#100#100\$				
Knowledge evaluation after semester	Practical exam				
Student activities:	Aktivnost (Written exam) (Oral exam)		ECTS 6 6		
Remark	This course can not be used for final thesis theme				
Prerequisites:	Students cannot enroll in this course unless they have passed Betonske konstrukcije II Students cannot enroll in this course unless they have completed Zgradarstvo I Students cannot enroll in this course unless they have completed Instalacije zgrada I Students cannot enroll in this course unless they have completed Završni radovi Students cannot enroll in this course unless they have completed Montažne građevine Students cannot enroll in this course unless they have completed Osnove željeznica				
ISVU equivalents:	22388;39175;39176;65159;65395;147437;147439;147440;147441;155979;155980;155981;				



Code WEB/ISVU	23470/155980	ECTS	12.0	Academic year	2018/2019
Name	Final Thesis with Field Practice				
Status	6th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				240+0 (0+0+0+0) 120
Teachers	Lectures:1. Jagoda Bodić dipl.ing.arh.				
Course objectives	Use of acquired knowledge for independent realization of practical engineering tasks				
Learning outcomes:	1.identify problem or development areas. Level:6 2.analyse achievements made in this area. Level:6 3.break down problem areas or development areas into individual components. Level:6 4.develop a proposal or solution for a problematic situation. Level:6,7 5.develop a practical solution to a problem. Level:6,7 6.define limits and generalization possibilities for the final paper. Level:6,7 7.present work results. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching				
Course content lectures	1.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 2.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 3.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 4.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 5.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 6.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 7.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 8.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 9.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 10.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 11.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 12.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 13.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 14.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 15.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7				
Required materials	Special equipment				
Exam literature	U dogovoru s mentorom				
Students obligations	maximum of 3 absences from exercises				
Knowledge evaluation during semester	Prakti ispit#1#100#100\$				
Knowledge evaluation after semester	Practical exam				
Student activities:	Aktivnost (Written exam) (Oral exam)		ECTS 6 6		
Remark	This course can not be used for final thesis theme				
Prerequisites:	Students cannot enroll in this course unless they have passed Hidrologija i hidraulika Students cannot enroll in this course unless they have completed Osnove željeznica Students cannot enroll in this course unless they have completed Ceste II Students cannot enroll in this course unless they have completed Regulacije i melioracije Students cannot enroll in this course unless they have completed Opskrba vodom i odvodnja I Students cannot enroll in this course unless they have completed Vodnogospodarske građevine				
ISVU equivalents:	22388;39175;39176;65159;65395;147437;147439;147440;147441;155979;155981;155982;				



Code WEB/ISVU	23469/155979	ECTS	12.0	Academic year	2018/2019
Name	Final Thesis with Field Practice				
Status	6th semester - Management in Civil Engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				240+0 (0+0+0+0) 120
Teachers					
Course objectives	Use of acquired knowledge for independent realization of practical engineering tasks				
Learning outcomes:	1.identify problem or development areas. Level:6 2.analyse achievements made in this area. Level:6 3.break down problem areas or development areas into individual components. Level:6 4.develop a proposal or solution for a problematic situation. Level:6,7 5.develop a practical solution to a problem. Level:6,7 6.define limits and generalization possibilities for the final paper. Level:6,7 7.present work results. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching				
Course content lectures	1.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 2.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 3.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 4.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 5.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 6.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 7.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 8.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 9.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 10.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 11.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 12.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 13.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 14.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7 15.As agreed with the tutor (mentor), 16h, Learning outcomes:1,2,3,4,5,6,7				
Required materials	Video equipment Maquette .				
Exam literature	U dogovoru s mentorom				
Students obligations	maximum of 3 absences from exercises				
Knowledge evaluation during semester	Prakti ispit#1#100#100\$				
Knowledge evaluation after semester	Practical exam				
Student activities:	Aktivnost (Written exam) (Oral exam)		ECTS 6 6		
Remark	This course can not be used for final thesis theme				
Prerequisites:	Students cannot enroll in this course unless they have passed Tržište i poslovno okruženje Students cannot enroll in this course unless they have completed Organizacija gradilišta Students cannot enroll in this course unless they have completed Metodologija i menadžment u graditeljstvu Students cannot enroll in this course unless they have completed Poslovanje tvrtke Students cannot enroll in this course unless they have completed Regulativa i vođenje projekata Students cannot enroll in this course unless they have completed Osnove željeznica				
ISVU equivalents:	22388;39175;39176;65159;65395;147437;147439;147440;147441;155980;155981;155982;				

Code WEB/ISVU	23473/155983	ECTS	5.0	Academic year	2018/2019
Name	Finishing Works				
Status	5th semester - Building Construction (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (6+0+0+24) 90
Teachers	Lectures:1. Sanja Lađarević dipl.ing.arh. Lectures:2. dr.sc. Dražen Arbutina dipl.ing.arh. Auditory exercises: Goran Babić Construction exercises: Goran Babić				
Course objectives	Students will acquire knowledge about finishing works regarded as a phase in building construction, and also about materials, their utilisation and placement/installation techniques.				
Learning outcomes:	1.comment on boundary structures taken as a part of the complex system of vertical and horizontal parts of the building. Level:6 2.identify external and internal physical influences as determinants in selecting the structure and materials during formation of boundary structure layers. Level:6 3.identify functional and aesthetic requirements as a part of total solutions for boundary structure of the building, and the use of appropriate materials in structural parts of the building. Level:6 4.draw structural solution details for multi-layered walls. Level:6 5.differentiate ways for closing openings depending on the type of material and construction method. Level:6 6.draw door and window details. Level:6 7.propose an appropriate building protection against precipitation involving an appropriate roof covering and evacuation of water by sheet metal elements, with graphical presentation of the solution. Level:6,7 8.draw floor and ceiling lining details using different materials based on appropriate functional and aesthetic requirements. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Other 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.				
Methods of carrying out auditory exercises	Group problem solving Other Instructions for preparation of the graphical assignment				
How construction exercises are held	Group problem solving Discussion, brainstorming Other Preparation of graphical assignments with corrections and assistance from the lecturer.				
Course content lectures	1.Introduction, notion of finishing works as a phase in building construction, 2h, Learning outcomes:6 2.Boundary structures/elements as a part of a complex system of vertical and horizontal parts of a building. , 2h, Learning outcomes:6 3.Physical factors influencing formation of structural layers , 2h, Learning outcomes:6 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. , 2h, Learning outcomes:6 5.Use of appropriate materials at structural portions of a building , 2h, Learning outcomes:6 6. Multilayer walls, details of structural solutions, 2h, Learning outcomes:6 7. Multilayer walls, details of structural solutions, 2h, Learning outcomes:6 8. Multilayer walls, details of structural solutions, 2h, Learning outcomes:6 9.Closing openings: with wood, plastics, steel, aluminium; window and door details, 2h, Learning outcomes:6 10.Closing openings: with wood, plastics, steel, aluminium; window and door details, 2h, Learning outcomes:6 11.Building protection against atmospheric influences - roof covering work, details of roof cover made of modern materials, water evacuation with steel sheet elements, 2h, Learning outcomes:6 12.Building protection against atmospheric influences - roof covering work, details of roof cover made of modern materials, water evacuation with steel sheet elements, 2h, Learning outcomes:6 13. Floors - selection of materials and details , 2h, Learning outcomes:6 14. Floors - selection of materials and details , 1h, Learning outcomes:6 Lining for ceilings - materials and details , 1h, Learning outcomes:6 15.Lining for ceilings - materials and details , 2h, Learning outcomes:6				
Course content auditory	1.Instructions for the preparation and presentation of graphical assignments or seminar papers, 2h, Learning outcomes:6 2.Instructions for the preparation and presentation of graphical assignments or seminar papers, 1h, Learning outcomes:6 3.Instructions for the preparation and presentation of graphical assignments or seminar papers, 1h, Learning outcomes:6 4.Instructions for the preparation and presentation of graphical assignments or seminar papers, 1h, Learning outcomes:6 5.Instructions for the preparation and presentation of graphical assignments or seminar papers, 1h, Learning outcomes:6 6.. 7.. 8.. 9.. 10.. 11.. 12.. 13..				

	14.. 15..										
Course content constructures	1.. 2.Students individually solve complex building details , 1h, Learning outcomes:6 3.Students individually solve complex building details , 1h, Learning outcomes:6 4.Students individually solve complex building details , 1h, Learning outcomes:6 5.Students individually solve complex building details , 1h, Learning outcomes:6 6.Students individually solve complex building details , 2h, Learning outcomes:6 7.Students individually solve complex building details , 2h, Learning outcomes:6 8.Students individually solve complex building details , 2h, Learning outcomes:6 9.Students individually solve complex building details , 2h, Learning outcomes:6 10.Students individually solve complex building details , 2h, Learning outcomes:6 11.Students individually solve complex building details , 2h, Learning outcomes:6 12.Students individually solve complex building details , 2h, Learning outcomes:6 13.Students individually solve complex building details , 2h, Learning outcomes:6 14.Students individually solve complex building details , 2h, Learning outcomes:6 15.Students individually solve complex building details , 2h, Learning outcomes:6										
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment										
Exam literature	Basic literature: 1. M.Smoljanović: Separati predavanja, crteži detalja 2. ?. Peulić: Konstruktivni elementi zgrada I i II, Tehnička knjiga, Zagreb, 1980.(odabrana poglavlja) Additional literature: 1. Heinrich Schmitt: Hochbaukonstruktion 4. Martin Mittag: Građevinske konstrukcije 2. Prospekti proizvođača pojedinih suvremenih materijala										
Students obligations	maximum of 3 absences from exercises										
Knowledge evaluation during semester	Assignments: assignment submittal required for second signature.										
Knowledge evaluation after semester	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.										
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>1</td></tr> <tr> <td>(Project)</td><td>2</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	1	(Project)	2	(Constantly tested knowledge)	1	(Written exam)	1
Aktivnost	ECTS										
(Classes attendance)	1										
(Project)	2										
(Constantly tested knowledge)	1										
(Written exam)	1										
Remark	This course can be used for final thesis theme										
Prerequisites:	Students cannot enroll in this course unless they have passed Građevinski materijali Students cannot enroll in this course unless they have passed Elementi zgrada II Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have completed Betonske konstrukcije II										
ISVU equivalents:	22386;										

Code WEB/ISVU	23436/155933	ECTS	2.0	Academic year	2018/2019
Name	Geodesy				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (8+0+0+7) 30
Teachers	Lectures:1. prof. dr. sc. Đuro Barković dip. ing. geod. Auditory exercises:prof. dr. sc. Đuro Barković dip. ing. geod. Construction exercises:prof. dr. sc. Đuro Barković dip. ing. geod.				
Course objectives	Students will acquire some fundamental knowledge on geodesy as a profession, as well as some basic knowledge on geodesic activities that are applied in civil engineering.				
Learning outcomes:	1.define land survey activities that are most often used in civil engineering. Level:6 2.select most favourable land survey methods needed to conduct simple land survey activities in civil engineering. Level:7 3.select land survey instruments and accessories for simple geodetic measurements. Level:7 4.use theodolite to measure angles, level to measure differences in height, and measuring tapes for direct measurement of lengths. Level: 5.explain geodetic networks. Level:6,7 6.calculate coordinates and elevations of points, and calculate lengths, angles and areas based on known coordinates of points. Level:6 7.use topographic survey plans and maps as a basis for design work. Level: 8.present GIS in geodesy. Level:6,7 9.calculate angles and area of a figure based on defined coordinates. Level:6 10.define legal procedure for construction of objects. Level:6,7 11.propose systems for displacements and deformations measurements . Level:6,7				
Methods of carrying out lectures	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.				
Methods of carrying out auditory exercises	Group problem solving				
How construction exercises are held	Students perform measurements both individually and in teams.				
Course content lectures	1.History and future of geodesy. Classification of geodesy, 1h, Learning outcomes:1 2.Geodetic measurements and instruments , 1h, Learning outcomes:2 3.Measurement uncertainty and adjustments , 1h, Learning outcomes:3 4.Coordinate systems and coordinate types , 1h, Learning outcomes:4,6,7 5.Geodetic networks , 1h, Learning outcomes:5 6.Geodetic measurement of land , 1h, Learning outcomes:5,6,7 7.Satellite positioning , 1h, Learning outcomes:5,6 8.1. kolokvij, 1h, Learning outcomes:1,2,3,4,5,6,7 9.Geodetic registers, plans and maps , 1h, Learning outcomes:7 10.Geoinformation systems and E-service, 1h, Learning outcomes:8 11.Application of geodesy in civil engineering , 1h, Learning outcomes:9,10 12.Legal procedure for construction of objects, 1h, Learning outcomes:10 13.Determination of areas and ground masses , 1h, Learning outcomes:9 14.Measuring displacement and deformation of civil engineering structures , 1h, Learning outcomes:11 15.2. kolokvij, 1h, Learning outcomes:7,8,9,10,11				
Course content auditory	1.introduction to maps and plans, 1h, Learning outcomes:1 2.calculating distances and angles from the coordinates, 1h, Learning outcomes:6 3.calculating distances and angles from the coordinates, 1h, Learning outcomes:4,6 4.solving various triangles, 1h, Learning outcomes:2,3,5,7 5.solving various triangles, 1h, Learning outcomes:2,3,5,7 6.calculate the height of points, 1h, Learning outcomes:2,3 7.calculate the height of points, 1h, Learning outcomes:2,3 8.1. kolokvij, 1h, Learning outcomes:1,2,3,4,5,6,7 9.introduction to surveying instruments, 1h, Learning outcomes:8,9 10.introduction to level instrument, 1h, Learning outcomes:8,9 11.determine the volume of earthworks, 1h, Learning outcomes:8,9 12.determine the volume of earthworks, 1h, Learning outcomes:8,9 13.presentation of georobot, GNSS and laser scanner, 1h, Learning outcomes:10,11 14.prezentacija rada georobota, GNSS i laserskog skenera, 1h, Learning outcomes:10,11 15.2. kolokvij, 1h, Learning outcomes:7,8,9,10,11				
Course content constructs	1.introduction to maps and plans, 1h, Learning outcomes:1 2.calculating distances and angles from the coordinates, 1h, Learning outcomes:6 3.calculating distances and angles from the coordinates, 1h, Learning outcomes:4,6 4.solving various triangles, 1h, Learning outcomes:2,3,5,7 5.solving various triangles, 1h, Learning outcomes:2,3,5,7 6.calculate the height of points, 1h, Learning outcomes:2,3 7.calculate the height of points, 1h, Learning outcomes:2,3 8.1. kolokvij, 1h, Learning outcomes:1,2,3,4,5,6,7 9.introduction to surveying instruments, 1h, Learning outcomes:8,9 10.introduction to level instrument, 1h, Learning outcomes:8,9 11.determine the volume of earthworks, 1h, Learning outcomes:8,9 12.determine the volume of earthworks, 1h, Learning outcomes:8,9				



	13.presentation of georobot, GNSS and laser scanner, 1h, Learning outcomes:10,11 14.presentation of georobot, GNSS and laser scanner, 1h, Learning outcomes:10,11 15.2. kolokvij, 1h, Learning outcomes:7,8,9,10,11
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment
Exam literature	Basic literature: 1. Kapović, Z. (2010): Geodezija u niskogradnji, Geodetski fakultet, Sveučilišta u Zagrebu. 2. Pribičević, B. i Medak, D. (2003): Geodezija u građevinarstvu, V.B.Z. d.o.o. Zagreb. 3. Macarol, S. (1978): Praktična geodezija. Školska knjiga, Zagreb. (str.: 11-20, 26-28, 38-67, 194-201, 619-624) Additional literature: 1.Benčić, D. (2008): Mjerni instrumenti i sustavi u geodeziji i geoinformatici. Školska knjiga, Zagreb.
Students obligations	presence at lectures
Knowledge evaluation during semester	Redovitost pohaa#10#0#50\$Kolokvij, numeri zadaci#2#50#50\$Programski zadatak#2#100#0\$
Knowledge evaluation after semester	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.
Student activities:	Aktivnost ECTS (Classes attendance) 2
Remark	This course can not be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Matematika I
ISVU equivalents:	22354;
Proposal made by	prof. dr. sc. Zdravko Kapović

Code WEB/ISVU	23437/155934	ECTS	5.0	Academic year	2018/2019
Name	Geotechnical Engineering				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+4+16) 90
Teachers	Lectures:1. mr.sc. Željko Lebo v. pred. Lectures:2. dr.sc. Sonja Zlatović , profesor visoke škole Auditory exercises: Ivana Pavlič Seminar exercises: Ivana Pavlič Construction exercises: Ivana Pavlič				
Course objectives	Students will be educated to recognise geotechnical problems in civil engineering practice, which will enable them to independently solve urgent on-site problems and a number of not highly complex geotechnical problems, and also to communicate with geotechnical engineers and other experts participating in geotechnical investigations or in construction work involving geotechnical expertise.				
Learning outcomes:	1.estimate settlement and load bearing capacity of soil under foundations for given parameters of a horizontally stratified soil. Level:6,7 2.design foundations of a simple structure. Level:6,7 3.calculate actions on a freestanding retaining wall. Level:6 4.check stability of a freestanding retaining wall. Level:6 5.design a freestanding wall. Level:6,7 6.differentiate actions on different retaining structures. Level:6 7.differentiate foundation pit protection methods, possible hazards, necessary verifications. Level:6 8.differentiate soil improvement procedures. Level:6 9.check potential danger of hydraulic failure ant the foundation pit bottom, and protect pit against such danger. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Simulations Discussion Questions and answers Seminar, students presentation and discussion 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.				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming Other Problems are solved in the classroom. Active Learning Critical Thinking frame is used. Distant learning is used.				
Methods of carrying out seminars	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Essay writing Discussion, brainstorming Workshop 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	Group problem solving Discussion, brainstorming Students solve individual assignments.				
Course content lectures	1.Introduction. Soil clasiffication. Additional stresses, 2h, Learning outcomes:1,2 2.Soil strength and bearing capacity, 2h, Learning outcomes:1,2 3.Settlement and consolidation, 2h, Learning outcomes:1,2 4.Introduction into Eurocode 7., 2h, Learning outcomes:1,2 5.Geotechnical reports, 2h, Learning outcomes:3 6.Shallow foundations - requirements, design., 2h, Learning outcomes:1,2 7.Piles and deep foundations., 2h, Learning outcomes:3,4,5,6 8.1st test, 2h, Learning outcomes:3,4,5,6 9.Active and passive pressure., 2h, Learning outcomes:3,4,5,6 10.Retaining structure. Design of retaining structure, 2h, Learning outcomes:7,9 11.Hydraulic failure., 2h, Learning outcomes:3,4,5,6 12.Soil improvement. Ground improvement techniques, 2h, Learning outcomes:7,9 13.Technical observation in geotechnics (monitoring), 2h, Learning outcomes:8 14.Filed work, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 15.2nd test, 2h, Learning outcomes:7,8,9				
Course content auditory	1.Additional stresses, 2h, Learning outcomes:2 2.Direct shear test. Triaxial compression test, 2h, Learning outcomes:2 3.Settlement, 2h, Learning outcomes:2 4.Bearing capacity and settlement, Eurocode 7., 2h, Learning outcomes:2 5.No classes 6.No classes 7.No classes 8.No classes				

	9.Active and passive pressure_Rankine, Coulomb, 2h, Learning outcomes:2 10.Design of retaining structure according to EC7, 2h, Learning outcomes:2 11.Hydraulic failure, 2h, Learning outcomes:2 12.No classes 13.No classes 14.No classes 15.No classes
Course content seminars	1. - 2. - 3. - 4. - 5. - 6. - 7. - 8. - 9. - 10. - 11. - 12. - 13. - 14. - 15.-
Course content constructures	1. -, Learning outcomes:1,2 2. -, Learning outcomes:1,2 3. -, Learning outcomes:1,2 4. -, Learning outcomes:1,2 5.Design of shallow foundations. 1st assignment., 2h, Learning outcomes:1,2 6.1st assignment., 2h, Learning outcomes:3 7.1st assignment., 2h, Learning outcomes:3,4,5,6 8.*1st assignment., 2h, Learning outcomes:3,4,5,6 9.-, Learning outcomes:3,4,5,6 10.-, Learning outcomes:3,4,5,6 11.-, Learning outcomes:3,4,5,6 12.Stability of retaining wall. 2nd assignment., 2h, Learning outcomes:3,4,5,6 13.2nd assignment., 2h, Learning outcomes:7,9 14.2nd assignment., 2h, Learning outcomes:7,9 15. *2nd assignment., 2h, Learning outcomes:7,8,9
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Overhead projector
Exam literature	OBVEZNA 1.Lebo Ž.: Skripta sa predavanja 2.Nonveiller,E., 1981, Mehanika tla. Temeljenje građevina. Školska knjiga, Zagreb 3.Roje-Bonacci,T., 2005, Potporne građevine i građevne jame, Građevinsko-arhitektonski fakultet Sveučilišta u Splitu, Institut građevinarstva Hrvatske 4. Roje-Bonacci,T., 2010, Duboko temeljenje i poboljšanje temeljnog tla, Split : Građevinsko-arhitektonski fakultet Sveučilišta DOPUNSKA 1.Wood,D.M.,2004, Geotechnical Modelling, Spon Press, 2004, 504 str. 2.Bowles,J.E.,1982, Foundation Engineering Handbook, Van Nostrand Reinhold Co., 752 str. 3.Clayton,C.R.I, Milititsky,J., Woods,R.I.,1993, Earth Pressure and Earth-Retaining Structures, Blackie Academic Professional, 398 str. 4.Eurocode 7: Geotechnical design
Students obligations	All of the conditions to be fulfilled: 1. Regular attendance a) Attendance at 11 out of 15 lectures (attendance at the regular test is evaluated as attendance at lectures) b) Attendance at 15 of 15 exercises 2. Go to two tests and win at least 30 points per test 3. Create two program assignments, rated with a minimum of 20 points
Knowledge evaluation during semester	1. Regular attendance a) Attendance at 11 out of 15 lectures (attendance at the regular test is evaluated as attendance at lectures) b) Attendance at 15 of 15 exercises 2. Go to two tests and win at least 60 points per test 3. Create two program assignments, rated with a minimum of 30 points Students who obtain 180 or more points are invited to oral exam directly.



Knowledge evaluation after semester	The exam has a written and oral part.	
Student activities:	Aktivnost (Classes attendance) (Constantly tested knowledge) (Written exam) (Oral exam)	ECTS 1 2 1 1
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have completed Mehanika tla Students cannot enroll in this course unless they have passed Građevinski materijali Students cannot pass this course unless they have passed Mehanika tla	
ISVU equivalents:	22353;	
Proposal made by	mr.sc. Željko Lebo, v. pred., dr.sc. Sonja Zlatović, prof.v.šk.	



Code WEB/ISVU	23353/147433	ECTS	4.0	Academic year	2018/2019
Name	German Language I				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (30+0+0+0) 60
Teachers	Lectures:1. Doc. dr. sc. Lidija Tepeš Golubić v. pred. Auditory exercises: Doc. dr. sc. Lidija Tepeš Golubić v. pred.				
Course objectives	Students will acquire knowledge needed to successfully translate technical texts. Through systemic learning, development of general language and grammar competences, and practicing of language skills, they will achieve the A2 level (with some elements of B1/B2 levels) according to the Common European Framework of Reference for Languages.				
Learning outcomes:	1.use adequate techniques to consult professional texts, and find relevant information in such texts. Level: 2.demonstrate proper understanding of technical terminology, and capability to use such terminology in communication. Level: 3.demonstrate proficiency in the use of grammatical structures. Level: 4.interpret technical text and present opinion about the text. Level: 5.appropriately use all four language skills. Level: 6.show skill in the use of dictionaries, bilingual and monolingual. Level: 7.translate professional papers from German language to Croatian language. Level:				
Methods of carrying out lectures	Ex cathedra teaching Case studies Questions and answers Seminar, students presentation and discussion Homework presentation 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).				
Methods of carrying out auditory exercises	Group problem solving Essay writing Discussion, brainstorming 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 content lectures	1.Introductory lecture, 2h, Learning outcomes:1,2,3,4,5,6,7 2.Bauingenieurwesen, 2h, Learning outcomes:1,2,3,4,5,6,7 3.Bauingenieurwesen, 2h, Learning outcomes:1,2,3,4,5,6,7 4.Wie wird man Bauingenieur(in)?, 2h, Learning outcomes:1,2,3,4,5,6,7 5.Deutsche Grammatik, 2h, Learning outcomes:1,2,3,4,5,6,7 6.Motivation and Cover Letter for a Job Application, 2h, Learning outcomes:1,2,3,4,5,6,7 7.Wie verfasst man einen Lebenslauf?, 2h, Learning outcomes:1,2,3,4,5,6,7 8.Colloquium 1, 2h, Learning outcomes:1,2,3,4,5,6,7 9.Bauingenieure haben ein weites Feld..., 2h, Learning outcomes:1,2,5 10.Wie haben Erfindungen das Aussehen von Bauten verändert?, 2h, Learning outcomes:1,2,3,4,5,6,7 11.Traditional building materials, 2h, Learning outcomes:1,2,3,4,5,6,7 12.Building materials of the future, 2h, Learning outcomes:1,2,3,4,5,6,7 13.German loanwords in construction vocabulary, 2h, Learning outcomes:1,2,3,4,6,7 14.Die Entwicklung der ersten Wolkenkratzer, 2h, Learning outcomes:1,2,3,4,5,6,7 15.Colloquium 2, 2h, Learning outcomes:1,2,3,4,5,6,7				
Course content auditory	1.Introductory lecture, 2h, Learning outcomes:1,2,3 2.Bauingenieurwesen, 2h, Learning outcomes:1,2,3,5,6 3.Bauingenieurwesen, 2h, Learning outcomes:1,2,3,5,6 4.Wie wird man Bauingenieur(in)?, 2h, Learning outcomes:1,2,3,4,5,6,7 5.German Grammar, 2h, Learning outcomes:1,2,3,4,5,6,7 6.Motivation and Cover Letter for a Job Application, 2h, Learning outcomes:1,2,3,5,6 7.Wie verfasst man einen Lebenslauf?, 2h, Learning outcomes:1,2,3,4,5,6,7 8.Colloquium 1, 2h, Learning outcomes:1,2,3,4,5,6,7 9.Bauingenieure haben ein weites Feld..., 2h, Learning outcomes:1,2,4,5 10.Wie haben Erfindungen das Aussehen von Bauten verändert?, 2h, Learning outcomes:1,2,3,4,5,6,7 11.Traditional building materials, 2h, Learning outcomes:1,2,3,4,5,6,7 12.Building materials of the future, 2h, Learning outcomes:1,2,3,4,5,6,7 13.German loanwords in construction vocabulary, 2h, Learning outcomes:1,2,4,6,7 14.Die Entwicklung der ersten Wolkenkratzer, 2h, Learning outcomes:1,2,4 15.Colloquium 2, 2h, Learning outcomes:1,2,3,4,5,6,7				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector				
Exam literature	Basic literature: 1. A. Kralj-Štih: Deutsch im Bauingenieurwesen Gramatika s vježbama (interna skripta za studente TVZ, dostupna i na web-stranicama Veleučilišta, pripremila Angelina Puović, prof.) 2. Stručni časopisi iz svih područja graditeljstva. Tekstovi dostupni na stranicama Interneta Additional literature:				

	1. Rječnici (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; A. Prager: Građevinski rječnik. Masmedija (2003) 2. Gramatike (I. Medić, Deutsche Grammatik für jedermann, Školska knjiga, Zagreb, 2002.; T. Marčetić, Pregled gramatike njemačkog jezika, Školska knjiga, Zagreb, 2000.; Dreyer - Schmitt: Lehr- und Lernbuch der deutschen Grammatik, Verlag für Deutsch 2002) M. Čičin-Šain Buljan, J. Kosanović, A. Štampalija, Poslovni njemački 1, Ekonomski fakultet, Zagreb, 1998.	
Students obligations	Attending classes and participation in the process	
Knowledge evaluation during semester	Preliminary exam 1 and 2; seminar paper and/or pp presentation	
Knowledge evaluation after semester	Written and/or oral exam	
Student activities:	Aktivnost (Written exam) (Activity in class) (Essay) (Oral exam)	ECTS 1 1 1 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	No prerequisites.	
ISVU equivalents:	39030;39046;	
Proposal made by	PhD. Lidija Tepeš Golubić, senior lecturer, 1st of June 2015	

Code WEB/ISVU	23350/147429	ECTS	2.0	Academic year	2018/2019
Name	German Language II				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (15+0+0+0) 30
Teachers	Lectures:1. Doc. dr. sc. Lidija Tepeš Golubić v. pred. Auditory exercises: Doc. dr. sc. Lidija Tepeš Golubić v. pred.				
Course objectives	Students will acquire knowledge needed to successfully translate technical texts. Through systemic learning, development of general language and grammar competences, and practicing of language skills, they will achieve the A2 level (with some elements of B1/B2 levels) according to the Common European Framework of Reference for Languages.				
Learning outcomes:	1.formulate CV and job application in German language. Level:6,7 2.analyse technical text and check hypotheses defined in advance, in order to motivate students to develop a critical attitude toward the text they are reading. Level:6 3.prepare a presentation in German language on given a technical topic. Level:6,7 4.write an abstract and a written report about a topic read. Level:6,7 5.prepare a technical letter, application, etc.. Level:6,7 6.present a topic in German language. Level:6,7 7.develop language skills in business communication and use basic business terminology. Level:6,7 8.combine earlier acquired knowledge with technical language. Level:6,7				
Methods of carrying out lectures	Discussion Questions and answers Seminar, students presentation and discussion Homework presentation 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).				
Methods of carrying out auditory exercises	Group problem solving Essay writing Discussion, brainstorming Interactive problem solving 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 content lectures	1.Introductory lecture, 2h, Learning outcomes:7,8 2.German grammar exercises , 2h, Learning outcomes:7,8 3.Construction and Building Materials, 2h, Learning outcomes:6,7,8 4.Construction Waste Management , 2h, Learning outcomes:2,6,7,8 5.Hochbau und Tiefbau, 2h, Learning outcomes:6,7,8 6.Hochbau und Tiefbau, 2h, Learning outcomes:5,6,7,8 7.Colloquium 1, 2h, Learning outcomes:1,2,3,4,5,6,7,8 8.German grammar exercises, 2h, Learning outcomes:7,8 9.Preparing the documentation for building permit, 2h, Learning outcomes:5,6,7,8 10.Preparing the documentation for building permit, 2h, Learning outcomes:5,6,7,8 11.Job application letter, 2h, Learning outcomes:1,4,5,6,7,8 12.Bridges, 2h, Learning outcomes:4,6,7,8 13.Tunnels, 2h, Learning outcomes:4,6,7,8 14.Modern Building Concepts , 2h, Learning outcomes:4,6,7,8 15.Colloquium, 2h, Learning outcomes:1,2,3,4,5,6,7,8				
Course content auditory	1.Introductory lecture, 2h, Learning outcomes:2,6,7,8 2.German grammar exercises, 2h, Learning outcomes:2,3,4,5,6 3.Construction and building materials, 2h, Learning outcomes:3,4,5,6,7,8 4.The early skyscrapers, 2h, Learning outcomes:2,3,4,5,6 5.Building construction: Hochbau und Tiefbau, 2h, Learning outcomes:2,4,6,7,8 6.Building construction: Hochbau und Tiefbau, 2h, Learning outcomes:2,4,6,8 7.Preliminary exam 1, 2h, Learning outcomes:1,2,3,4,5,6,7,8 8.German grammar exercises, 2h, Learning outcomes:2,3,4,5,6,7 9.Preparing the documentation for building permit, 2h, Learning outcomes:2,3,4,5,6,7,8 10.Preparing the documentation for building permit, 2h, Learning outcomes:2,3,4,5,6,7 11.Job application, 2h, Learning outcomes:1,2,3,4,5,6,7,8 12.Bridges, 2h, Learning outcomes:2,3,6,7,8 13.Tunnels, 2h, Learning outcomes:2,3,6,7 14.Presentation on a given subject/theme regarding profession, 2h, Learning outcomes:1,2,3,4,5,6,7,8 15.Presentation on a given subject/theme regarding profession, 2h, Learning outcomes:1,2,3,4,5,6,7,8				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector				
Exam literature	Basic literature: 1. A. Kralj-Štih: Deutsch im Bauingenieurwesen Gramatika s vježbama (interna skripta za studente TVZ, dostupna i na web-stranicama Veleučilišta, pripremila Angelina Puović, prof.) 2. Stručni časopisi iz svih područja graditeljstva. Tekstovi dostupni na stranicama Interneta				

	Additional literature: 1. Rječnici (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. Gramatike (I. Medić, Deutsche Grammatik fr jedermann, Školska knjiga, Zagreb, 2002.; T. Marčetić, Pregled gramatike njemačkog jezika, Školska knjiga, Zagreb, 2000.; Dreyer - 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.	
Students obligations	maximum of 3 absences from exercises	
Knowledge evaluation during semester	Colloquium 1 and 2, student papers and student class attendance	
Knowledge evaluation after semester	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.	
Student activities:	Aktivnost (Written exam) (Activity in class)	ECTS 1 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have completed Njemački jezik u graditeljstvu I Students cannot pass this course unless they have passed Njemački jezik u graditeljstvu I	
ISVU equivalents:	22351;155952;	
Proposal made by	PhD. Lidija Tepeš Golubić, senior lecturer, 11th of June 2018	

Code WEB/ISVU	23356/147442	ECTS	2.0	Academic year	2018/2019
Name	Historical Develepment of Civil Engineering				
Status	6th semester - Building Construction (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+0 (0+0+0+0) 30
Teachers	Lectures:1. dr.sc. Dražen Arbutina dipl.ing.arh.				
Course objectives	Introduction 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.				
Learning outcomes:	1.identify historic forms of civil engineering. Level:6 2.differentiate stylistic and typological properties of buildings. Level:6 3.analyse basic specific features of structural systems of historic buildings. Level:6 4.sketch elements of stylistic, plastic and functional properties of historic buildings. Level:6 5.evaluate specific requirements during work on historic and monumental buildings. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Discussion Questions and answers Seminar, students presentation and discussion Homework presentation Other 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 content 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) , 1h, Learning outcomes:1,2,3,4,5 PREHISTORY, PROTOHISTORY, 1h, Learning outcomes:1,2,3,4,5 2.EGYPT, 2h, Learning outcomes:1,2,3,4 3.MESOPOTAMIA (Sumer, Akkad, Babylonia, Assyria), 1h, Learning outcomes:1,2,3,4 MEDITERRANEAN MIDDLE EAST (Kanan, Palestine, Phoenicia, Syria, Hittites) , 0.5h, Learning outcomes:1,2,3,4 PERSIA, 0.5h, Learning outcomes:1,2,3,4 4.PREHELLENIC AEGEAN CIRCLE (Malta, Cyclades, Cyprus, Crete, Asia Minor , 0.5h, Learning outcomes:1,2,4 GREECE, 1.5h, Learning outcomes:1,2,3,4,5 5.ETRURIA , 0.5h, Learning outcomes:1,2,3,4 ROME, 1.5h, Learning outcomes:1,2,3,4,5 6.EARLY CHRISTIAN PERIOD , 0.75h, Learning outcomes:1,2,3,4,5 BYZANT AND BYZANTINE CRICLE (Italy, Balkans, Asia Minor, Russia) , 0.75h, Learning outcomes:1,2,3,4,5 ISLAM, 0.5h, Learning outcomes:1,2,3,4,5 7.PRE-ROMANESQUE PERIOD , 0.5h, Learning outcomes:1,2,3,4,5 ROMANESQUE PERIOD , 1.5h, Learning outcomes:1,2,3,4,5 8.GOTHICS, 2h, Learning outcomes:1,2,3,4,5 9.RENAISSANCE AND MANIRISM, 2h, Learning outcomes:1,2,3,4,5 10.BAROQUE, ROCOCO AND EARLY CLASSICISM, 2h, Learning outcomes:1,2,3,4,5 11.9TH CENTURY AND EARLY 20TH CENTURY (Biedermeier, Historicism, Secession, Art Deco, Late Academism), 2h, Learning outcomes:1,2,3,4,5 12.20TH CENTURY (early Modern Style, modern construction after the second world war, present-day construction) , 2h, Learning outcomes:1,2,3,4,5 13.ANCIENT EXTRA-EUROPEAN CULTURES (India, China, Indochina, Japan, Africa, Oceania, Australia, North, Central and South Americas), 2h, Learning outcomes:1,2,3,4 14.TRADITIONAL (POPULAR) CONSTRUCTION PRACTICES, 2h, Learning outcomes:1,2,3,4,5 15.PROTECTION OF CULTURAL HERITAGE AND BASIC PRINCIPLES USED IN RENOVATION OF HISTORIC BUILDINGS, 2h, Learning outcomes:1,2,3,4,5				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Portable overhead projector Video equipment				
Exam literature	Basic literature: 1. J.J. NORWICH; N. PEVSNER: Velike arhitekture svijeta, Zagreb, 1981.; 2. D. Arbutina: Povijesni razvoj graditeljstva [separati predavanja],Zagreb, 2011. 3. Z. KARAČ: Povijesni razvoj graditeljstva [interna skripta],Zagreb, 2005. Additional literature: 1. B. Zevi: Povijest moderne arhitekture, Arhitektonski fakultet Sveučilišta u Zagrebu, Zagreb, 2007.; 2. B. MILIĆ: Razvoj grada kroz stoljeća, I-III, Zagreb, 1991.-1995.-2002.; 3. W. MULLER; G. VOGEL: Atlas arhitekture, I-II, Zagreb, 1999.-2000.; 4. K. FREMPTON: Moderna arhitektura. Krička povijest, Zagreb, 1992.; 5. H.W. JANSON: Povijest umjetnosti, Varaždin, 2003.; 6. A. FREUDENREICH: Kako narod gradi, Zagreb, 1972.; 7. T. MARASOVIĆ: Aktivni pristup graditeljskom naslijeđu, Split, 1985.;				



Students obligations	Class attendance - measured as a minimum presence on 75% of the classes.	
Knowledge evaluation during semester	During the semester, students will have short proficiency tests and other methods of their work evaluation (short assessment or short proficiency tests are possible on each of the classes, before or after the end of the presentation, as well as individual and group presentations and analysis of smaller student seminar tasks, with a record of students activities during discussion). During the semester two major colloquiums are planned.	
Knowledge evaluation after semester	The final examination consists of the written part of of the test (including written and graphical) and the oral examination.	
Student activities:	Aktivnost (Written exam) (Oral exam)	ECTS 1 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have passed Betonske konstrukcije II	



Code WEB/ISVU	23465/155974	ECTS	4.0	Academic year	2018/2019
Name	Hydraulic Structures				
Status	5th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+15 (9+0+0+6) 75
Teachers	Lectures: Ivana Bartolić, pred. Lectures: dr.sc. Mladen Petrićec dipl.ing.grad. Auditory exercises: Željko Pavlin dipl.ing.grad. Auditory exercises: Berislav Rupčić Construction exercises: Berislav Rupčić				
Course objectives	Students will gain basic theoretical knowledge on water management structures and facilities, as well as practical skills for participation in the project development and design process.				
Learning outcomes:	1.test sea water condition in nature, and test a marine structure on a physical model in the scope of an expert team. Level:6 2.draw a marine structure in the scope of a design team. Level:6 3.prepare bill of quantities for a massive concrete marine structure and an earthfill marine structure. Level:6 4.analyse a massive concrete marine structure and an earthfill marine structure in the scope of a design team. Level:6 5.check stability of a concrete gravity dam. Level:6 6.make calculations for the spillway and bottom outlet of a dam. Level:6 7.calculate annual production of a run-of-river hydropower plant. Level:6 8.calculate volume of the water-storage reservoir and retarding basin based on the topographic survey data. Level:6 9.differentiate types of flow regulation. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Other 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.				
Methods of carrying out auditory exercises	Group problem solving Mind mapping Computer simulations Other Instructions for the preparation of programs				
How construction exercises are held	Other Students independently work on program with constant supervision and help of teacher				
Course content lectures	1.Overview of marine structures, 2h, Learning outcomes:1,2 2.Sea waves - theory, forecasts, design waves, sea levels, 2h, Learning outcomes:1,2 3.Sea waves - theory, forecasts, design waves, sea levels, 2h, Learning outcomes:1,2 4.Sea waves - theory, forecasts, design waves, sea levels, 1h, Learning outcomes:1,2 Design of typical marine structures, 1h, Learning outcomes:2,3 5.Design of typical marine structures, 2h, Learning outcomes:2,3 6.Design of typical marine structures, 2h, Learning outcomes:2,3 7.Maritime construction technology, 2h, Learning outcomes:2,3 8.Preliminary exam, 1h, Learning outcomes:2,3 Inflow regulation - demand and types, purpose, components and sizing of reservoirs, 1h, Learning outcomes:8,9 9.Inflow regulation - demand and types, purpose, components and sizing of reservoirs, 2h, Learning outcomes:8,9 10.Inflow regulation - demand and types, purpose, components and sizing of reservoirs, 2h, Learning outcomes:8,9 11.Dams - types and sizing, 2h, Learning outcomes:3,4,5 12.Dams - types and sizing, 1h, Learning outcomes:3,4,5 Preliminary exam, 1h, Learning outcomes:3,4,5,8,9 13.Intake and outlet, 2h, Learning outcomes:6 14.Intake and outlet, 1h, Learning outcomes:6 Preliminary exam, 1h, Learning outcomes:4,5,6 15.Powerhouse, 1h, Learning outcomes:7 Preliminary exam - corrections, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9				
Course content auditory	1.Breakwater stability, 1h, Learning outcomes:1,2,3 2.Breakwater stability, 1h, Learning outcomes:1,2,3 3.Conceptual design of breakwaters, 1h, Learning outcomes:1,2,3 4.Conceptual design of breakwaters, 1h, Learning outcomes:1,2,3 5.Conceptual design of breakwaters, 1h, Learning outcomes:1,2,3 6.nema vjebi 7.nema vjebi 8.Gravity dam stability, 1h, Learning outcomes:4,5 9.Spillway calculation, 1h, Learning outcomes:6 10.Bottom outlet calculation, 1h, Learning outcomes:6 11.Run-off-the-river plant output calculation, 1h, Learning outcomes:7 12.nema vjebi 13.nema vjebi 14.nema vjebi 15.nema vjebi				
Course content constructures	1.nema vjebi 2.nema vjebi 3.nema vjebi				

	4.nema vjebi 5.nema vjebi 6.Breakwater stability, 1h, Learning outcomes:2,3,4 7.Breakwater stability, 1h, Learning outcomes:2,3,4 8.nema vjebi 9.nema vjebi 10.nema vjebi 11.nema vjebi 12.Gravity dam stability, 1h, Learning outcomes:5 13.Spillway calculation, 1h, Learning outcomes:6 14.Bottom outlet calculation, 1h, Learning outcomes:6 15.Run-off-the-river plant output calculation, 1h, Learning outcomes:7										
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment Students independently work on program with constant supervision and help of teacher										
Exam literature	P. Stojić: Hidrotehničke građevine I i II, FGZ Split, 1997., 1998. Z. Tadejević, M. Pršić: Pomorska hidraulika I, skripta Građevinskog fakulteta, Zagreb, 1981. HKIG: Program iskorištenja slobodnog hidropotencijala u Republici Hrvatskoj Separati koje priprema nastavnik										
Students obligations	Regular attendance - max 25% of absence At least 10 points from each of three colloquiums (each colloquium max 20 points), homeworks, and exercises										
Knowledge evaluation during semester	Total max 60 points less then 30 points, underachievement										
Knowledge evaluation after semester	Written part of 40 points. Student have to achieve min 20 points. Total with points from colloquium max 100 points 90-100=5 80-89,9=4 65-79,9=3 50-64,9=2 less then 50 points, underachievement										
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>1</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>1</td></tr> <tr> <td>(Practical work)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	1	(Constantly tested knowledge)	1	(Practical work)	1	(Written exam)	1
Aktivnost	ECTS										
(Classes attendance)	1										
(Constantly tested knowledge)	1										
(Practical work)	1										
(Written exam)	1										
Remark	This course can be used for final thesis theme										
Prerequisites:	Students cannot enroll in this course unless they have completed Vodogradnje Students cannot enroll in this course unless they have passed Osnove hidrologije i hidraulike Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Hidrologija i hidraulika Students cannot pass this course unless they have passed Vodogradnje Students cannot pass this course unless they have passed Hidrologija i hidraulika										
ISVU equivalents:	22375;										
Proposal made by	Senior Lecturer Željko Pavlin 24.02.2014										

Code WEB/ISVU	23439/155936	ECTS	5.0	Academic year	2018/2019
Name	Hydrology and Hydraulics				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - elective course 4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (12+0+6+12) 90
Teachers	Lectures: Ivana Bartolić, pred. Lectures: dr.sc. Mladen Petrić dipl.ing.građ. Auditory exercises: Ivana Bartolić, pred. Auditory exercises: Filip Kalinić mag. ing. aedif. Seminar exercises: Ivana Bartolić, pred. Seminar exercises: Filip Kalinić mag. ing. aedif. Construction exercises: Ivana Bartolić, pred. Construction exercises: Filip Kalinić mag. ing. aedif.				
Course objectives	Students will learn how to recognise and independently solve tasks in the fields of hydrology and hydraulics, in the process of problem-solving activities related to water management.				
Learning outcomes:	1.present and define basic properties of meteorological and hydrological sequences of precipitation, temperatures, water levels, flows. Level:6,7 2.calculate frequency and duration curves for basic hydrological parameters (water level, flow). Level:6 3.establish basic statistical parameters for hydrological data sets. Level:6 4.calculate dimensions of simple systems under pressure (pump, pipeline). Level:6 5.propose solutions for simple canal facilities (sill, spillway, stilling basin, etc.). Level:6,7 6.calculate ground water discharge toward wells and structures by hydraulic method. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Discussion Other 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.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming 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).				
Methods of carrying out seminars	Discussion, brainstorming Other Seminar work and presentation of work and explanation.				
How construction exercises are held	Group problem solving Computer simulations As part of design exercises, a preparation of two programs is planned.				
Course content lectures	1.Introduction to the subject and plan of that study., 1h Hydrometric measurements and analysis of collected data., 1h, Learning outcomes:1 2.Hydrometric measurements and analysis of collected data., 2h, Learning outcomes:1 3.River basin drainage., 2h, Learning outcomes:1 4.Urban drainage., 1h, Learning outcomes:1 Hydrological processes in watercourses., 1h, Learning outcomes:2 5.Hydrological processes in watercourses., 1h, Learning outcomes:2 Mathematical statistic calculations., 1h, Learning outcomes:3 6.Mathematical statistic calculations., 2h, Learning outcomes:3 7.Water flows in pressure systems., 2h, Learning outcomes:4 8.I.preliminary exam., 2h, Learning outcomes:1,2,3 9.No lessons. 10.Hydraulics of water supply and hydropower generation., 2h, Learning outcomes:4 11.Water flows in open watercourses., 2h, Learning outcomes:5 12.Overflow and seepage through water works., 1h, Learning outcomes:5 Hydraulic jump., 1h, Learning outcomes:5 13.Groundwater flows., 1h, Learning outcomes:6 Hydraulic theory of groundwater flow - flow calculation to water supplies (wells, galleries), 1h, Learning outcomes:6 14.Hydraulic theory of groundwater flow - flow calculation to water supplies (wells, galleries), 1h, Learning outcomes:6 Basics of the theory of potential flow in porous media., 1h, Learning outcomes:6 15.II. preliminary exam, 2h, Learning outcomes:4,5,6 Repeated I or II. preliminary exam., 2h, Learning outcomes:1,2,3,4,5,6				
Course content auditory	1.Introductory explanation of the content and organization of exercises., 2h 2.Solving examples runoff and processing of hydrological measurements., 2h, Learning outcomes:1,2 3.Determination of flow curve and distribution of characteristic flows., 2h, Learning outcomes:3 4.No lessons. 5.No lessons. 6.No lessons. 7. Examples of stationary flow under pressure., 2h, Learning outcomes:4 8.Calculations of stationary uniform flow in open watercourses., 2h, Learning outcomes:5 9.Calculation of seepage, overflow and hydraulic jump., 2h, Learning outcomes:5 10.Calculation of flow towards wells in porous environments under specific boundary conditions., 2h, Learning outcomes:6 11.No lessons. 12.No lessons.				

	13.No lessons. 14.No lessons. 15.No lessons.	
Course content seminars	1.No lessons. 2.No lessons. 3.No lessons. 4.Explanation of contents ways to solve I. seminar work, 1h, Learning outcomes:2,3 5.No lessons. 6.The presentation and explanation I. seminar work, 2h, Learning outcomes:2,3 7.No lessons. 8.No lessons. 9.Nema nastave. 10.No lessons. 11.Explanation of contents ways to solve II. seminar work, 1h, Learning outcomes:4 12.No lessons. 13.Explanation of contents ways to solve III. seminar work., 1h, Learning outcomes:5 14.No lessons. 15.The presentation and explanation II. and III. seminar work., 2h, Learning outcomes:4,5	
Course content constructures	1.No lessons. 2.No lessons. 3.No lessons. 4.Work on the first seminar task in the area of hydrology., 1h, Learning outcomes:2,3 5.Work on the first seminar task in the area of hydrology., 2h, Learning outcomes:2,3 6.No lessons. 7.No lessons. 8.No lessons. 9.No lessons. 10.No lessons. 11.Work on the second. seminar task - flow systems under pressure., 1h, Learning outcomes:4 12.Work on the second. seminar task - flow systems under pressure., 2h, Learning outcomes:4 13.Work on the III. seminar task - flow in open channels., 1h, Learning outcomes:5 14.Work on the III. seminar task - flow in open channels., 2h, Learning outcomes:5 15.No lessons.	
Required materials	Basic: classroom, blackboard, chalk... Special purpose computer laboratory Whiteboard with markers Overhead projector Video equipment Planned to attend experiments in hydro-technical laboratory GF in Zagreb or field work of hydrological measurements.	
Exam literature	Osnovna: 1. Mladen Petričec: Hidrologija i hidraulika - interna skripta, Zagreb 2011. 2. Živko Vuković: Osnove hidrotehnike I/1, Akvamarine Zagreb, 1996. 3. Ranko Žugaj: Hidrologija, RGN fakultet, Zagreb 2000. Dodatna: 1. Dionis Srebrenović: Primijenjena hidrologija, Tehnička knjiga, Zagreb, 1986. 2. I. Agroskin i suradnici: Hidraulika, Tehnička knjiga, Zagreb, 1973. 3. Vinko Jović: Osnove hidromehanike, Element, Zagreb, 2006.	
Students obligations	Attendance of lectures and exercises. In the two preliminary exams and three seminars achieve a minimum score of 30 mark points.	
Knowledge evaluation during semester	During the semester, on preliminary exams and seminars, student can achieve maximum 60 mark points. Student which achieve at least 30 mark points during the semester is allowed to take a final exam. Student which during the semester achieve more than 15 and less then 30 mark points can take additional test. If student after additional test achieve at least 30 mark points she/he is allowed to take an final exam. Student which during semester achieve less than 15 mark points in the next year must enroll the subject again.	
Knowledge evaluation after semester	All students must take a final exam to pass the subject. On final exam, which typically consists of written (solving numerical problems) and oral part, students can achieve 40 mark points. For the positive evaluation of the exam student should achieve at lest 20 mark points (50 %). The final subject mark contains of mark points scored during the semester and on final exam: 90 - 100 - A 80 89.9 - B 65 79.9 - C 60 - 64.9 - D 50 59.9 - E	
Student activities:	Aktivnost (Constantly tested knowledge) (Oral exam)	ECTS 3 2
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have completed Osnove hidrologije i hidraulike Students cannot pass this course unless they have passed Osnove hidrologije i hidraulike	



ISVU equivalents:	22372;
Proposal made by	Dr.sc. Mladen Petrićec, prof. v.šk.

Code WEB/ISVU	22993/39869	ECTS	2.0	Academic year	2018/2019
Name	Introduction to Hydraulic Structures				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (15+0+0+0) 30
Teachers	Lectures:1. mr.sc. Gorana Čosić-Flajsig viši predavač Lectures:dr.sc. Mladen Petrić dipl.ing.građ. Auditory exercises: Filip Kalinić mag. ing. aedif. Auditory exercises: Dejan Kovačević dipl.ing.građ.				
Course objectives	Teach students to recognise the significance and role of hydraulic engineering in water management, types of structures and their design.				
Learning outcomes:	1.classify types of energy from the utilisation aspect. Level:6,7 2.classify water power. Level:6,7 3.differentiate types of hidropower plants and their components. Level:6 4.differentiate types of marine structures. Level:6 5.differentiate types of water supply systems. Level:6 6.differentiate types of sewage systems. Level:6 7.classify water supply system consumers and wastewater types. Level:6,7 8.identify regulation types. Level:6 9.differentiate types of drainage and irrigation structures. Level:6 10.differentiate types of water ways and facilities/structures. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Students are gradually introduced to the basics of water management structures through graphic presentations, photographs and explanations.				
Methods of carrying out auditory exercises	Group problem solving Mind mapping 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 content lectures	1.Energy and power-division, 1h, Learning outcomes:1 2.Basic types of hydropower plants, 1h, Learning outcomes:3 3.The main buildings of hydropower plant, 1h, Learning outcomes:3 4.Overview of marine construction buildings, 1h, Learning outcomes:4 5.Public water supply systems, 1h, Learning outcomes:5 6.Buildings of public water supply systems, 1h, Learning outcomes:5 7.Public sewage systems, 1h, Learning outcomes:6 8.Building of public sewage systems, 1h, Learning outcomes:6 9.Wastewater treatment, 1h, Learning outcomes:7 10.The Second Colloquium, 1h, Learning outcomes:5,6,7 11.River regulation - Elemental streams, 1h, Learning outcomes:8 12.River regulation - hydrologic-hydraulic characteristics, 1h, Learning outcomes:8 13.Amelioration - Drainage and Irrigation, 1h, Learning outcomes:9 14.Inland waterways, 1h, Learning outcomes:9 15.Oral part of exam, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10				
Course content auditory	1.Basic principles of water power, 1h, Learning outcomes:2 2.The basic elements of selecting the type of hydroelectric, 1h, Learning outcomes:3 3.The basic elements of the main building hydropower plants, 1h, Learning outcomes:3 4.The basic elements of the quay, breakwater and ports, 1h, Learning outcomes:4 5.The first colloquium, 1h, Learning outcomes:1,2,3,4 6.Basis of public water supply system calculation, 1h, Learning outcomes:5 7.Basis of public water supply system calculation, 1h, Learning outcomes:5 8.Basis of public sewage system calculation, 1h, Learning outcomes:6 9.Basis of public sewage system calculation, 1h, Learning outcomes:6 10.Regulating constructions, 1h, Learning outcomes:8 11.Basis of melioration drainage calculaton, 1h, Learning outcomes:8,9 12.Basis of melioration irrigation calculation, 1h, Learning outcomes:9 13.Buildings on Inland Waterways, 1h, Learning outcomes:9 14.The third colloquium, 1h, Learning outcomes:8,9,10 15.Remedial Colloquium, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10				
Required materials	Whiteboard with markers Overhead projector Video equipment Through a carefully selected set of tasks students are taught basic calculations of elements for individual water works, which were dealt with during lectures.				
Exam literature	Ž. Vuković: Osnovi hidrotehnike I/1 i I/2, 1996. Zagreb				
Students obligations	Regular attendance - a maximum of 25% of excused absences. At least 10 points from each of the three colloquiums, each colloquium max 20 points, and three homeworks				
Knowledge evaluation during semester	Three written colloquiums with 20 points . For each colloquium is necessary to accomplish min. 10 points. total max. 60 points. less then 30 under-achievement. 30-38,9 points= 2				



	39-47,9 points=3 48-53,9 points= 4 54-60 points=5						
Knowledge evaluation after semester	No exam after the end of the semester. Rating is based on the results of the colloquium: 30-38,9 points = 2 39-47,9 points = 3 48-53,9 points = 4 54-60 points = 5						
Student activities:	<table><tr><td>Aktivnost</td><td>ECTS</td></tr><tr><td>(Classes attendance)</td><td>1</td></tr><tr><td>(Constantly tested knowledge)</td><td>1</td></tr></table>	Aktivnost	ECTS	(Classes attendance)	1	(Constantly tested knowledge)	1
Aktivnost	ECTS						
(Classes attendance)	1						
(Constantly tested knowledge)	1						
Remark	This course can not be used for final thesis theme						
Prerequisites:	Students cannot pass this course unless they have passed Osnove hidrologije i hidraulike Students cannot enroll in this course unless they have completed Osnove hidrologije i hidraulike						
ISVU equivalents:	22344;						
Proposal made by	Senior Lecturer, Željko Pavlin, 24.02.2014.						

Code WEB/ISVU	23455/155964	ECTS	5.0	Academic year	2018/2019
Name	Introduction to Hydrology and Hydraulics				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+15 (12+0+3+0) 105
Teachers	Lectures: Ivana Bartolić , pred. Lectures: dr.sc. Mladen Petrićec dipl.ing.grad. Auditory exercises: Ivana Bartolić , pred. Auditory exercises: Filip Kalinić mag. ing. aedif. Seminar exercises: Ivana Bartolić , pred. Seminar exercises: Filip Kalinić mag. ing. aedif.				
Course objectives	Educate students on how to recognise basic water circulation processes and states of water, and how to solve simple problems in the fields of hydrology and hydromechanics.				
Learning outcomes:	1.analyse and select dominant indicators for evacuation of water from smaller drainage basins (precipitation, temperature, evaporation, drainage-basin properties, etc.). Level:6 2.sort (systematise) meteorological and hydrological measurement data of significance for water runoff calculations. Level:6 3.solve simpler problems relating to the field of hydrostatics. Level:6 4.calculate basic parameters for an ideal liquid flow under pressure. Level:6 5.calculate basic hydraulic parameters for the open stream flow. Level:6 6.identify and resolve elementary problems of water flow in porous media.. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Discussion Questions and answers 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.				
Methods of carrying out auditory exercises	Group problem solving Tasks are solved on the backboard, with active student participation. It is planned to visit and learn about the tasks of the State Meteorological and Hydrological Institute and Croatian waters.				
Methods of carrying out seminars	Traditional literature analysis Data mining and knowledge discovery on the Web Other				
Course content lectures	1.Introduction to the subject and plan of that study., 1h Water and water resources, physical characteristics of water., 2h, Learning outcomes:1 2.Water cycles in nature, runoff, drainage area runoff, flow in watercourses., 2h, Learning outcomes:1 3.Monitoring and measurement of meteorological and hydrological phenomena and their characteristics., 2h, Learning outcomes:2 4.Monitoring and measurement of meteorological and hydrological phenomena and their characteristics., 2h, Learning outcomes:2 5.No lessons. 6.Pressure diagrams and water pressure forces., 2h, Learning outcomes:3 7.Pressure diagrams and water pressure forces., 1h, Learning outcomes:3 Types of movement, velocity, acceleration and law of conservation of mass., 1h, Learning outcomes:4 8.Types of movement, velocity, acceleration and law of conservation of mass., 2h, Learning outcomes:4 9.Odranje kolie gibanja., 2h, Learning outcomes:4 10.I. Preliminary exam., 2h, Learning outcomes:1,2,3 11.Flow under pressure., 2h, Learning outcomes:4 12.Flow under pressure., 2h, Learning outcomes:4 13.Basic notions on flow in open watercourse., 2h, Learning outcomes:5 14.Basics on water flow through porous environment., 2h, Learning outcomes:6 15.II. Preliminary exam., 2h, Learning outcomes:4,5,6 Repeated I or II. preliminary exam., 2h, Learning outcomes:1,2,3,4,5,6				
Course content auditory	1.Introduction to the subject and method of that study., 1h 2.Calculation examples for evapotranspiration., 1h, Learning outcomes:1 3.Calculation examples for evapotranspiration., 1h, Learning outcomes:1 4.Average rainfall in a basin, and design rainfall intensity., 1h, Learning outcomes:2 5.Average rainfall in a basin, and design rainfall intensity., 1h, Learning outcomes:2 6.Determination of pressure diagram and water pressure on structures., 1h, Learning outcomes:3 7.Determination of pressure diagram and water pressure on structures., 1h, Learning outcomes:3 8.Determination of pressure diagram and water pressure on structures., 1h, Learning outcomes:3 9.Prora brzine i ubrzanja, kolie gibanja., 1h, Learning outcomes:4 10.Prora brzine i ubrzanja, kolie gibanja., 1h, Learning outcomes:4 11.Examples of stationary flow of an ideal liquid under pressure., 1h, Learning outcomes:4 12.Examples of stationary flow of an ideal liquid under pressure., 1h, Learning outcomes:4 13.Determination of specific energy of profile, and calculation of stationary uniform flow in open watercourses., 1h, Learning outcomes:5 14.Determination of specific energy of profile, and calculation of stationary uniform flow in open watercourses., 1h, Learning outcomes:5 15.Simple examples of water seepage through a porous environment , 1h, Learning outcomes:6				

Course content seminars	1.No lessons. 2.No lessons.. 3.No lessons. 4.No lessons. 5.No lessons. 6.No lessons.. 7.No lessons. 8.Explanation of tasks and ways of solving I. seminar work., 2h, Learning outcomes:1,2,3 9.No lessons. 10.No lessons. 11.No lessons. 12.No lessons. 13.Explanation of tasks and ways of solving I. seminar work., 2h, Learning outcomes:4,5,6 14.No lessons. 15.No lessons.						
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Operating supplies						
Exam literature	Basic literature: 1. Osnove hidrologije i hidralike, skripte, Tehničko veleučilište u Zagrebu, 2011. 2. Živko Vuković: Osnove hidrotehnike I/1, Akvamarine Zagreb, 1996. 3. Ranko Žugaj: Hidrologija, RGN fakultet, Zagreb 2000. Additional literature: 1. Dionis Srebrenović: Primijenjena hidrologija, Tehnička knjiga, Zagreb, 1986. 2. Vinko Jović: Osnove hidromehanike, Element, Zagreb, 2006.						
Students obligations	Attendance of lectures and exercises. In the two preliminary exams and two seminars achieve a minimum score of 30 mark points.						
Knowledge evaluation during semester	During the semester, on preliminary exams and seminars, student can achieve maximum 60 mark points. Student which achieve at least 30 mark points during the semester is allowed to take an final exam. Student which during the semester achieve more than 15 and less then 30 mark points can take additional test. If student after additional test achieve at least 30 mark points she/he is allowed to take an final exam. Student which during semester achieve less than 15 mark points in the next year must enroll the subject again.						
Knowledge evaluation after semester	All students must take a final exam to pass the subject. On final exam, which typically consists of written (solving numerical problems) and oral part, students can achieve 40 mark points. For the positive evaluation of the exam student should achieve at lest 20 mark points (50 %). The final subject mark contains of mark points scored during the semester and on final exam: 90 - 100 - A 80 - 89.9 - B 65 - 79.9 - C 60 - 64.9 - D 50 - 59.9 - E The exam consists of written and oral parts. The written exam consists in solving tasks. A necessary condition for the oral part of the exam is the realization of 50% and more resolved the written part of the exam.						
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>3</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Constantly tested knowledge)	3	(Oral exam)	2
Aktivnost	ECTS						
(Constantly tested knowledge)	3						
(Oral exam)	2						
Remark	This course can not be used for final thesis theme						
Prerequisites:	Students cannot enroll in this course unless they have passed Matematika I Students cannot enroll in this course unless they have passed Nacrtna geometrija u graditeljstvu I Students cannot enroll in this course unless they have completed Osnove geologije						
ISVU equivalents:	22345;39870;147428;						

Code WEB/ISVU	23354/147434	ECTS	2.0	Academic year	2018/2019
Name	Introduction to Physical Planning				
Status	6th semester - Building Construction (Redovni graditeljstvo) - obligatory course6th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course6th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course6th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+0 (0+0+0+0) 30
Teachers	Lectures:1. dr.sc. Dražen Arbutina dipl.ing.arh.				
Course objectives	Introduction to basic principles of the urban and physical planning profession. Introduction to the theory of urban and physical planning, and to practical problems related to the planning and development of urban areas and larger areas (regions).				
Learning outcomes:	1.identify practical problems with regard to urban and physical planning). Level:6 2.generalize basic theoretical urban-planning and physical-planning assumptions). Level:6,7 3.check physical planning requirements during development of civil engineering projects. Level:6 4.define activities and necessary interdisciplinary work structure that have to be conducted during preparation and implementation of physical planning documents. Level:6,7 5.correlate basic specific features of historic development of towns, modern physical planning requirements and practical physical-planning problems with theoretical assumptions . Level:6,7 6.define necessary basic physical planning and legal activities based on construction and urban development regulations during preparation of physical planning documents. Level:6 7.generate basic urban development and general physical development requirements for mostly transport and water engineering infrastructure during cooperation in the development of physical planning documentation. Level:6,7				
Involvement of learning outcomes of the course in study programme:	6.5.OKUG NAPRAVITI jednostavnije troškovnike i organizaciju te voditi građenje jednostavnih građevina: 5h in 60h				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Discussion Questions and answers Seminar, students presentation and discussion Homework presentation Other 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 content lectures	1.Introductory theses - Definition of urban and physical planning (space, town, physical planning activities, basic professional relationships, interdisciplinarity in planning), 2h, Learning outcomes:2 2.Development of towns I (Antiquity and the Middle Ages), 1h, Learning outcomes:2,3 Development of towns II (Modern Age and present-day urbanism), 1h, Learning outcomes:2,3 3.Man and space. Processes in space (Primary and secondary urbanisation, village, town), 2h, Learning outcomes:1,2,3,4 4.Geographic conditions for the establishment and development of towns and population growth, 1h, Learning outcomes:1,2,3,4,7 Transport, its significance and transport-generated opening to other areas, 1h, Learning outcomes:1,2,3,4,5,7 5.Industry and industrial areas, 1h, Learning outcomes:1,2,3,4,5,7 Tourism and its influence on space, 1h, Learning outcomes:1,2,3,4,5,7 6.Agricultural and forest land, 1h, Learning outcomes:1,2,3,4,7 Environmental impacts. Impacts in coastal areas, 1h, Learning outcomes:1,2,3,4,5,7 7.Protection of space. Areas with special properties: natural reserves, memorial parks and national parks, 1h, Learning outcomes:1,2,3,4,5,7 Space management (space management instruments, real property ownership, land rent, contribution for utility services, etc.), 1h, Learning outcomes:1,4,7 8.Urban agglomeration, conurbation and megalopolis. Region. Homogeneous, polarised, administrative, 1h, Learning outcomes:1,2,3,4,5 Urban functions of towns, 1h, Learning outcomes:1,2,3,4 9.Municipal infrastructure (water and power infrastructure facilities, municipal level hygiene, municipal zones, municipal system management), 1h, Learning outcomes:1,2,3,4 Urban area aesthetics (urban composition, public space in urban areas with improvement and equipment, parks and green spaces), 1h, Learning outcomes:1,2,3,4 10.Zagreb - urban problems; synthesizing interpretation and discussion, 2h, Learning outcomes:1,2,3,4,5 11.Town planning and civil engineering regulations (laws, administrative documents, technical documentation, plan elaboration procedure, subjects participating in plan elaboration), 1h, Learning outcomes:2,3 Cartographic data and plan types (survey documents, cadastre, GIS, etc., hierarchy of spatial and urban plans; types, scales, graphics, preparation procedure, and approval), 1h, Learning outcomes:1,4,5 12.Method and technology for preparation of physical plans, 1h, Learning outcomes:1,3,5,6,7 Regional development plan (level: state, counties, municipalities; system of settlements; transport system, natural environment; activities in space; population), 1h, Learning outcomes:2,3,4,6,7 13.Town area regulation (functional town zoning, urban structure, matrix, microuban elements), 1h, Learning outcomes:2,3,4,5,6,7 Urban reconstruction and renewal of urban heritage; Elements of urban sociology, 1h, Learning outcomes:2,3,4,6,7 14.Detailed urban development plan I - Residential zones in towns (individual housing zones, collective housing zones, amenities), 1h, Learning outcomes:2,3,4,5,6,7 Detailed urban development plan II - Transport in urban areas (rural transport terminals, urban transport network, transport corridor profile, parking, public transportation in urban areas), 1h, Learning outcomes:2,3,4,5,6,7				

	15.Ruralism - planning and development of rural settlements and spaces; Environmental protection in physical and urban planning (fire, earthquake, floods, landslides, war, noise, pollution...), 1h, Learning outcomes:2,3,4 Practical problems during preparation and implementation of physical plans, 1h, Learning outcomes:1,3,5,6,7						
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Portable overhead projector Video equipment						
Exam literature	Basic literature: 1.B.Milić: "Razvoj grada kroz stoljeća I - III" , Zagreb, 1994.-2002.; 2.S.Pegan: Urbanizam - Uvod u detaljno urbanističko planiranje, Arhitektonski fakultet Sveučilišta u Zagrebu, 2007. 3.N. Lipovac: "Uvod u zakonodavstvo prostornog uređenja", Arhitektonski fakultet Sveučilišta u Zagrebu, 2012. 4.N. Lipovac: "Stručna metodologija izrade dokumenata prostornog uređenja", Tehničko veleučilište u Zagrebu, Zagreb, 2010. 5.A.Marinović-Uzelac: "Prostorno planiranje", Dom i svijet, Zagreb 2001. 6.A. Marinović-Uzelac: "Naselja, gradovi, prostori", Tehnička knjiga, Zagreb, 1986 4) M. Vresk: "Grad u urbanom i regionalnom planiranju", Zagreb, 1990. Additional literature: 7.L. MUMFORD: Grad u historiji, Zagreb, 1988.; 8.Marinović-Uzelac, A.; Socijalni prostor grada, Zagreb, 1978.; 9.Marinović-Uzelac, A.; Teorija namjene površina u urbanizmu, Zagreb, 1989.; 10.M. Maretić: "Gradski centri", Školska knjiga, Zagreb, 1996. 11.M. Vresk: Grad i urbanizacija, Školska knjiga, Zagreb, 2002. 12.Čaldarović, O.; Urbana sociologija, Zagreb, 1985.; 13.Pegan, S.; Komunalna tehnika gradova [Interna skripta AF], Zagreb, 1996.;						
Students obligations	Class attendance - measured as a minimum presence on 75% of the classes and one short proficiency tests positively evaluated						
Knowledge evaluation during semester	During the semester, students will have short proficiency tests and other methods of their work evaluation (short assessment or short proficiency tests are possible on each of the classes, before or after the end of the presentation, as well as individual and group presentations and analysis of smaller student seminar tasks, with a record of students activities during discussion). During the semester two major colloquiums are planned.						
Knowledge evaluation after semester	The final examination consists of the written part of of the test (including written and graphical) and the oral examination.						
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Written exam)	1	(Oral exam)	1
Aktivnost	ECTS						
(Written exam)	1						
(Oral exam)	1						
Remark	This course can not be used for final thesis theme						
Prerequisites:	Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Proračun konstrukcija						



Code WEB/ISVU	22879/22330	ECTS	2.0	Academic year	2018/2019
Name	Introduction to Railways				
Status	5th semester - Building Construction (Redovni graditeljstvo) - obligatory course5th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course5th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course5th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+0 (0+0+0+0) 30
Teachers	Lectures:1. 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, plants and facilities.				
Learning outcomes:	1.analyse basic problems in the organisation of railway transport. Level:6 2.establish similarities and differences between traditional tracks and continuous welded rail tracks. Level:6 3.identify basic elements of railways, demonstrate practical knowledge in the construction and maintenance of railways. Level:6,7 4.identify special structures in the track (turnouts) types, differences and problems in use. Level:6 5.calculate unannulled lateral acceleration, superelevation in curves, and transition ramp lengths in transition curves. Level:6				
Methods of carrying out lectures	Case studies Discussion Questions and answers Other 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 content lectures	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 Type of traction. Principal characteristics (advantages and shortcomings), steam locomotive, electric locomotive, and diesel locomotive , 1h, Learning outcomes:1 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). Train stations (classification, tracks, signals, equipment used in passenger and freight stations. , 1h, Learning outcomes:1 3. Forces acting on the track (static and dynamic - vertical and horizontal). (1) Permanent way elements: 1. Rails: Production. Marks. Quality of steel. Types. Rail wear , 1h, Learning outcomes:2,3,4 4. 2. Rail accessories: Fastening accessories. Problems. Structural solutions (Germany, France, England). Connection accessories. Glued insulating joint. Small accessories. Safety caps. Rail travel blocking devices , 2h, Learning outcomes:2,3,4 5. Sleepers: Steel sleepers. Advantages and shortcomings. Reinforced-concrete sleepers. Advantages and shortcomings. Wooden sleepers. Advantages and shortcomings. Fabrication, durability, and protection, 1h, Learning outcomes:2,3 6.Ballast: Objectives. Prism dimensions. Thickness. Materials. Ballast. Grain size and shape. Contamination. Screening, 2h, Learning outcomes:2,3 7.Special track accessories (points, turntables, travelling platforms, triangles), 2h, Learning outcomes:4 8.First - preliminary exam, 2h 9. 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., 2h, Learning outcomes:4 10.Track orientation - regulations. Direction arrows. Rectification methods for horizontal curves. Three-point method, 3h, Learning outcomes:2,3 11.Track inspection. Control of geometry. Inspection of individual elements. General inspection of the track, 3h, Learning outcomes:2,3 12.Track works and systemisation of works. Regular. Seasonal. Occasional. Big works (overhauls) - Railway repair shed organization and schematic representation, 3h, Learning outcomes:2,3 13.Repair of track substructure. Replacement train. Track maintenance works. Track welding. AT weld. ET weld. Advantages and shortcomings. Comparison , 3h, Learning outcomes:2,3 14.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 pre-lifting), 2h, Learning outcomes:2 15.Second - final preliminary exam, 2h				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Portable overhead projector Video equipment				
Exam literature	Basic literature: 1. Stipetić, A.: Gornji ustroj željezničkoga kolosijeka, FPZ, Zagreb, 2008. 2. Pollak, B.: ŽELJEZNICE, Građevinski institut, FGZ, Zagreb, 1988. 3. Bajić, A.G.: Separati predavanja. Additional literature: 1. P-314 PRAVILNIK O GORNJEM USTROJU, Hrvatske željeznice, Zagreb 2. P-315 PRAVILNIK O DONJEM USTROJU, Hrvatske željeznice, Zagreb				
Students obligations	maximum of 3 absences from exercises				
Knowledge evaluation during	Redovitost pohaa#5#0#40\$Kolokvij, teorijska pitanja#2#100#60\$				



semester	
Knowledge evaluation after semester	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)
Student activities:	Aktivnost (Classes attendance) ECTS 2
Remark	This course can not be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Nacrtna geometrija u graditeljstvu II

Code WEB/ISVU	23276/143316	ECTS	1.0	Academic year	2018/2019
Name	Kinesiology Education I				
Status	1st semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				0+30 (30+0+0+0) 0
Teachers	Auditory exercises: 1. Natalija Špehar viši predavač				
Course objectives	Students will acquire knowledge about the basic bio-psycho-social human need for dynamic expression and movement, benefits of regular physical exercise during the entire lifetime, influence on anthropological characteristics (functional, motoric and cognitive capabilities, conative properties, and morphologic features), and about improvement and preservation of health and working capacity.				
Learning outcomes:	1. demonstrate proper realization of technical elements in a sports activity. Level: 6,7 2. explain basic terms relating to a particular sports activity. Level: 3. formulate basic rules relating to a particular sports activity. Level: 4. recognise exercises for individual muscle groups. Level: 5. explain significance of warming up and stretching in the course of a sports activity. Level: 6. describe organisation and conduct of student sporting events. Level: 7. consider significance of a lifelong regular physical activity. Level:				
Methods of carrying out auditory exercises	Workshop Physical Education Exercises				
Course content auditory	1. Repeating technical elements of a specific kinesiological activity, 4h, Learning outcomes: 1 2. Repeating technical elements of a specific kinesiological activity, 2h, Learning outcomes: 2 3. Adopting new elements of a specific kinesiological activity, 2h, Learning outcomes: 1 4. Adopting new elements of a specific kinesiological activity, 2h, Learning outcomes: 2 5. Using auxiliary and elementary games in the learning process of a specific kinesiological activity, 2h, Learning outcomes: 4 6. Improving the elements of a specific kinesiological activity, 2h, Learning outcomes: 1 7. Improving the elements of a specific kinesiological activity, 2h, Learning outcomes: 2 8. Adopting a set of warm-up exercises for a specific kinesiological activity, 2h, Learning outcomes: 5 9. Adopting a set of stretching exercises for a specific kinesiological activity, 2h, Learning outcomes: 5 10. Repeating the basic rules of a specific kinesiological activity, 2h, Learning outcomes: 3 11. Adoption of basic technical and tactical elements of a specific kinesiological activity, 2h, Learning outcomes: 1 12. Adoption of basic technical and tactical elements of a specific kinesiological activity, 2h, Learning outcomes: 3 13. Competition and Games, 2h, Learning outcomes: 6 14. Competition and Games, 2h, Learning outcomes: 6 15. Training and automation of injury prevention exercises, 2h, Learning outcomes: 7				
Required materials	Special equipment Gym / pool and equipment needed for each sport activity (balls, rackets, markers...)				
Exam literature	Basic literature: Nema obvezne literature budući da se ispit iz tjelesne i zdravstvene kulture ne polaže. Studente se upućuje na literaturu vezanu uz tjelesnu i zdravstvenu kulturu, poboljšanje i očuvanje zdravlja, pravilnu prehranu, prevenciju nastanka ozljeda, povijest sporta, pravila sporta, načine i ciljeve treninga, važnost redovitog vježbanja tijekom cijelog života, novosti u svijetu sporta, rekreacije i kineziterapije. Additional literature: 1. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: FFK 2. Anderson, B., E. Burke, B. Pearl (1997.). Fitness za sve, Zagreb: Gopal. 3. Anderson, B. (2001.). Stretching. Zagreb: Gopal. 4. Clark, N. (2000). Sportska prehrana. Zagreb: Gopal. 5. Delavier, F. (2001). Streinght training anatomy. Paris. Human Kinetics. 6. Dick, F. W. (1997). Sports Training Principles. London. A C Black. 7. Ellis J., J. Henderson (1997.). Trčanje bez ozljeda, Zagreb: Gopal. 8. Jukić, I., Marković, G. (2005.). Kondicijske vježbe s utezima. Zagreb. Kineziološki fakultet Sveučilišta u Zagrebu 9. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2000). Spolno prenosive bolesti, Reproductivno zdravlje, Metode i sredstva za zaštitu od trudnoće, Zagreb. 10. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2001). Kontracepcija - vodič kroz metode i sredstva za spriječavanje trudnoće, Zagreb. 11. Kulier, I (2003). Strategija mršavljenja, Zagreb: Impress. 12. Kulier, I. (2001). Što jedemo, Zagreb: Impress. 13. Medved, R. i suradnici (1987). Sportska medicina. Zagreb: Juma. 14. Milanović, D. i suradnici (1997). Priručnik za sportske trenere. Zagreb: FFK 15. Mišigoj-Duraković, M., i suradnici (1995). Morfološka antropologija u športu. Zagreb. FFK 16. Pearl, B. (1994.). Getting stronger, Kalifornija, Bolinas: Shelter Publications. Inc. 17. Špehar, N. (2014). Tjelesna aktivnost u funkciji zdravlja - nastavni materijal iz Tjelesne i zdravstvene kulture, dostupno online na web stranicama TVZ-a Obavijesti i informacije na internet adresi http://nastava.tvz.hr/tzk-GRO				
Students obligations	Students are required to actively participate in exercises during 30 hours per semester, during four semesters. 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 at both lectures and exercises. Students who are not required to attend because of active participation in sports are however required to attend all lectures, assist in the organization and implementation of lectures, and attend a specially devised program if permitted to do so by the sports doctor.				
Knowledge evaluation during semester	Redovitost pohaa#18#100#0\$Prakti rad#10#0#0\$				



Knowledge evaluation after semester	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). 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.	
Student activities:	Aktivnost (Classes attendance)	ECTS 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	No prerequisites.	
ISVU equivalents:	38171;85288;	
Proposal made by	Natalija Špehar, Senior Lecturer	



Code WEB/ISVU	23277/143317	ECTS	1.0	Academic year	2018/2019
Name	Kinesiology Education II				
Status	2nd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				0+30 (30+0+0+0) 0
Teachers	Auditory exercises: 1. Natalija Špehar viši predavač				
Course objectives	Students will acquire knowledge about the basic bio-psycho-social human need for dynamic expression and movement, benefits of regular physical exercise during the entire lifetime, influence on anthropological characteristics (functional, motoric and cognitive capabilities, conative properties, and morphologic features), and about improvement and preservation of health and working capacity.				
Learning outcomes:	1. demonstrate correct performance of technical elements in individual sports activities. Level: 2. select exercises for individual muscle groups. Level: 3. distinguish between training methods for individual motoric and functional capabilities. Level: 6 4. compare different physical activities and their influence on anthropological characteristics. Level: 6, 7 5. explain basic health benefits of regular physical exercise. Level: 6. make a distinction between nutrients and their role in the organism. Level: 6 7. explain basic connection between physical exercises and body voluminosity. Level:				
Methods of carrying out auditory exercises	Workshop Physical Education Exercises				
Course content auditory	1. Repeating technical elements of a specific kinesiological activity, 2h, Learning outcomes: 1 2. Repeating technical elements of a specific kinesiological activity, 2h, Learning outcomes: 1 3. Adopting new elements of a specific kinesiological activity, 2h, Learning outcomes: 1 4. Adopting new elements of a specific kinesiological activity, 2h, Learning outcomes: 1 5. Adopting a set of exercises for each muscle group, 2h, Learning outcomes: 2 6. Adopting a set of exercises for each muscle group, 2h, Learning outcomes: 2 7. Establishing the rules of a specific kinesiological activity, 2h, Learning outcomes: 6 8. Adopting different training methods, 2h, Learning outcomes: 3 9. Adopting different training methods, 2h, Learning outcomes: 3 10. Implementation of the elements of various sporting activities, 2h, Learning outcomes: 4 11. Training of injury prevention exercises, 2h, Learning outcomes: 5 12. Adoption of basic technical and tactical elements of a specific kinesiological activity, 2h, Learning outcomes: 6 13. Adoption of basic technical and tactical elements of a specific kinesiological activity, 2h, Learning outcomes: 6 14. Competition and Games, 2h, Learning outcomes: 7 15. Competition and Games, 2h, Learning outcomes: 7				
Required materials	Special equipment Gym / pool and equipment needed for each sport activity (balls, rackets, markers...)				
Exam literature	Basic literature: Nema obvezne literature budući da se ispit iz tjelesne i zdravstvene kulture ne polaže. Studente se upućuje na literaturu vezanu uz tjelesnu i zdravstvenu kulturu, poboljšanje i očuvanje zdravlja, pravilnu prehranu, prevenciju nastanka ozljeda, povijest sporta, pravila sporta, načine i ciljeve treninga, važnost redovitog vježbanja tijekom cijelog života, novosti u svijetu sporta, rekreacije i kineziterapije. Additional literature: 1. Jukić, I., Marković, G. (2005.). Kondicijske vježbe s utezima. Zagreb. Kineziološki fakultet Sveučilišta u Zagrebu 2. Anderson, B. (2001.). Stretching. Zagreb: Gopal. 3. Clark, N. (2000). Sportska prehrana. Zagreb: Gopal. 4. Čorak, N. (2001.). Fitness Bodybuilding, Zagreb: Hinus. 5. Delavier, F. (2001). Streinght training anatomy. Paris. Human Kinetics. 6. Dick, F. W. (1997). Sports Training Principles. London. A C Black. 7. Ellis J., J. Henderson (1997.). Trčanje bez ozljeda, Zagreb: Gopal. 8. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2000). Spolno prenosive bolesti, Reprodukivno zdravlje, Metode i sredstva za zaštitu od trudnoće, Zagreb. 9. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2001). Kontracepcija - vodič kroz metode i sredstva za sprječavanje trudnoće, Zagreb. 10. Kulier, I (2003). Strategija mršavljenja, Zagreb: Impress. 11. Kulier, I. (2001). Što jedemo, Zagreb: Impress. 12. Medved, R. i suradnici (1987). Sportska medicina. Zagreb: Jumena. 13. Milanović, D. i suradnici (1997). Priručnik za sportske trenere. Zagreb: FFK 14. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: FFK 15. Mišigoj-Duraković, M., i suradnici (1995). Morfološka antropologija u športu. Zagreb. FFK 16. Pearl, B. (1994.). Getting stronger, Kalifornija, Bolinas: Shelter Publications. Inc. 17. Špehar, N. (2014). Tjelesna aktivnost u funkciji zdravlja - nastavni materijal iz Tjelesne i zdravstvene kulture, dostupno online na web stranicama TVZ-a Obavijesti i informacije na internet adresi http://nastava.tvz.hr/tzk-GRO				
Students obligations	Students are required to actively participate in exercises during 30 hours per semester, during four semesters. 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 at both lectures and exercises. Students who are not required to attend because of active participation in sports are however required to attend all lectures, assist in the organization and implementation of lectures, and attend a specially devised program if permitted to do so by the sports doctor.				
Knowledge evaluation during semester	Redovitost pohaa#18#100#0\$Prakti rad#10#0#0\$				



Knowledge evaluation after semester	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.
Student activities:	Aktivnost (Classes attendance) ECTS 1
Remark	This course can not be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have enrolled Kineziološka kultura I
ISVU equivalents:	22363;38172;85289;
Proposal made by	Natalija Špehar, Senior Lecturer



Code WEB/ISVU	23278/143318	ECTS	1.0	Academic year	2018/2019
Name	Kinesiology Education III				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				0+30 (30+0+0+0) 0
Teachers	Auditory exercises: 1. Natalija Špehar viši predavač				
Course objectives	Students will acquire knowledge about the basic bio-psycho-social human need for dynamic expression and movement, benefits of regular physical exercise during the entire lifetime, influence on anthropological characteristics (functional, motoric and cognitive capabilities, conative properties, and morphologic features), and about improvement and preservation of health and working capacity.				
Learning outcomes:	1. demonstrate correct performance of technical elements in individual sports activities. Level: 2. explain purpose of tactical elements in individual sports activities. Level: 3. give an example of the way in which student sports competitions should be organized. Level: 4. classify basic kinesiology programs considering their influence on the organism. Level: 5. explain possibilities for participation in recreational and sporting activities in Croatia. Level: 6. give an example of how to conceive a personal training program for a week/month/year. Level: 7. describe how to successfully provide a first aid assistance in case of an injury during a sports activity. Level:				
Methods of carrying out auditory exercises	Workshop Physical Education Exercises				
Course content auditory	1. Improving the technical elements of a specific kinesiological activity., 2h, Learning outcomes: 1 2. Improving the technical elements of a specific kinesiological activity, 2h, Learning outcomes: 1 3. Establishing the rules of a specific kinesiological activity., 2h, Learning outcomes: 2 4. Establishing the rules of a specific kinesiological activity, 2h, Learning outcomes: 2 5. Improving the basic technical and tactical elements of a specific kinesiological activity, 2h, Learning outcomes: 1 6. Improving the basic technical and tactical elements of a specific kinesiological activity., 2h, Learning outcomes: 1 7. Game systems and tactics of a specific kinesiological activity., 2h, Learning outcomes: 2 8. Game systems and tactics of a specific kinesiological activity., 2h, Learning outcomes: 2 9. Team leadership, officiating, organization of competitions., 2h, Learning outcomes: 3 10. Training structure (content and organization) of a specific kinesiological activity., 2h, Learning outcomes: 4 11. Learning and application of a specific kinesiological activity for the purpose of independent regular exercise during free time., 2h, Learning outcomes: 5 12. Learning and application of a specific kinesiological activity for the purpose of independent regular exercise during free time., 2h, Learning outcomes: 6 13. Adoption of exercises for each muscle group for the prevention of occupational injuries., 2h, Learning outcomes: 7 14. Strength and mobility exercises for the prevention of injuries, First aid., 2h, Learning outcomes: 7 15. Basic characteristics of different kinesiological activities and their impact on anthropological characteristics., 2h, Learning outcomes: 4				
Required materials	Physical Education Exercises				
Exam literature	Basic literature: 1. Nema obvezne literature budući da se ispit iz tjelesne i zdravstvene kulture ne polaže. Studente se upućuje na literaturu vezanu uz tjelesnu i zdravstvenu kulturu, poboljšanje i očuvanje zdravlja, pravilnu prehranu, prevenciju nastanka ozljeda, povijest sporta, pravila sporta, načine i ciljeve treninga, važnost redovitog vježbanja tijekom cijelog života, novosti u svijetu sporta, rekreacije i kineziterapije. Additional literature: 1. Anderson, B., E. Burke, B. Pearl (1997.). Fitness za sve, Zagreb: Gopal. 2. Anderson, B. (2001.). Stretching. Zagreb: Gopal. 3. Clark, N. (2000). Sportska prehrana. Zagreb: Gopal. 4. Čorak, N. (2001.). Fitness Bodybuilding, Zagreb: Hinus. 5. Delavier, F. (2001). Streinght training anatomy. Paris. Human Kinetics. 6. Dick, F. W. (1997). Sports Training Principles. London. A C Black. 7. Ellis J., J. Henderson (1997.). Trčanje bez ozljeda, Zagreb: Gopal. 8. Jukić, I., Marković, G. (2005.). Kondicijske vježbe s utezima. Zagreb. Kineziološki fakultet Sveučilišta u Zagrebu 9. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2000). Spolno prenosive bolesti, Reprodukivno zdravlje, Metode i sredstva za zaštitu od trudnoće, Zagreb. 10. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2001). Kontracepcija - vodič kroz metode i sredstva za spriječavanje trudnoće, Zagreb. 11. Kulier, I (2003). Strategija mršavljenja, Zagreb: Impress. 12. Kulier, I. (2001). Što jedemo, Zagreb: Impress. 13. Medved, R. i suradnici (1987). Sportska medicina. Zagreb: Juma. 14. Milanović, D. i suradnici (1997). Priručnik za sportske trenere. Zagreb: FFK 15. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: FFK 16. Mišigoj-Duraković, M., i suradnici (1995). Morfološka antropologija u sportu. Zagreb. FFK 17. Pearl, B. (1994.). Getting stronger, Kalifornija, Bolinas: Shelter Publications. Inc. 18. Špehar, N. (2014). Tjelesna aktivnost u funkciji zdravlja - nastavni materijal iz Tjelesne i zdravstvene kulture, dostupno online na web stranicama TVZ-a Obavijesti i informacije na internet adresi http://nastava.tvz.hr/tzk-GRO				
Students obligations	maximum of 3 absences from exercises				
Knowledge evaluation during semester	Redovitost pohaa#18#100#0\$Prakti rad#10#0#0\$				
Knowledge evaluation after	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				



semester	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.
Student activities:	Aktivnost (Classes attendance) ECTS 1
Remark	This course can not be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Kineziološka kultura I
ISVU equivalents:	38173;85290;
Proposal made by	Natalija Špehar, Senior Lecturer



Code WEB/ISVU	23279/143319	ECTS	1.0	Academic year	2018/2019
Name	Kinesiology Education IV				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				0+30 (30+0+0+0) 0
Teachers	Auditory exercises: 1. Natalija Špehar viši predavač				
Course objectives	Students will acquire knowledge about the basic bio-psycho-social human need for dynamic expression and movement, benefits of regular physical exercise during the entire lifetime, influence on anthropological characteristics (functional, motoric and cognitive capabilities, conative properties, and morphologic features), and about improvement and preservation of health and working capacity.				
Learning outcomes:	1. demonstrate correct performance of technical elements in individual sports activities. Level: 2. explain purpose of tactical elements in individual sports activities. Level: 3. present a possible way of taking part in the organisation of student sports competitions. Level: 4. explain significance of lifelong healthy diet and regular exercise. Level: 5. give an example of how to conceive a personal training program for a week/month/year. Level: 6. define professional musculoskeletal system diseases of persons employed in construction industry. Level: 6 7. explain significance of physical activity in the prevention of professional musculoskeletal system diseases of persons employed in construction industry. Level:				
Methods of carrying out auditory exercises	Workshop				
Course content auditory	1. Adopting and improving the technical elements of a chosen kinesiological activity, 2h, Learning outcomes: 1 2. Adopting and improving the technical elements of a chosen kinesiological activity, 2h, Learning outcomes: 1 3. Improving the technical and tactical elements of a specific kinesiological activity, 2h, Learning outcomes: 2 4. Improving the technical and tactical elements of a specific kinesiological activity, 2h, Learning outcomes: 2 5. Establishing the rules of a specific kinesiological activity, 2h, Learning outcomes: 2 6. Establishing the rules of a specific kinesiological activity, 2h, Learning outcomes: 2 7. Analysis and methods of teaching a specific kinesiological activity, 2h, Learning outcomes: 4 8. Application of a specific kinesiological activity for the purpose of independent regular exercise during free time., 2h, Learning outcomes: 4 9. Application of a specific kinesiological activity for the purpose of independent regular exercise during free time., 2h, Learning outcomes: 4 10. Team leadership, officiating, organization of competitions, 2h, Learning outcomes: 3 11. Training structure (content and organization) of a specific kinesiological activity, 2h, Learning outcomes: 3 12. Training structure (content and organization) of a specific kinesiological activity, 2h, Learning outcomes: 3 13. Selection of exercises for each muscle group for the prevention of occupational injuries, 2h, Learning outcomes: 7 14. Basic characteristics of different kinesiological activities and their impact on anthropological characteristics, 2h, Learning outcomes: 6 15. Basic characteristics of different kinesiological activities and their impact on anthropological characteristics, 2h, Learning outcomes: 6				
Required materials	Special equipment Gym, swimming pool				
Exam literature	Basic literature: Nema obvezne literature budući da se ispit iz tjelesne i zdravstvene kulture ne polaže. Studente se upućuje na literaturu vezanu uz tjelesnu i zdravstvenu kulturu, poboljšanje i očuvanje zdravlja, pravilnu prehranu, prevenciju nastanka ozljeda, povijest sporta, pravila sporta, načine i ciljeve treninga, važnost redovitog vježbanja tijekom cijelog života, novosti u svijetu sporta, rekreacije i kineziterapije. Additional literature: 1. Pearl, B. (1994.). Getting stronger, Kalifornija, Bolinas: Shelter Publications. Inc. 2. Anderson, B. (2001.). Stretching. Zagreb: Gopal. 3. Clark, N. (2000). Sportska prehrana. Zagreb: Gopal. 4. Corak, N. (2001.). Fitness Bodybuilding, Zagreb: Hinus. 5. Delavier, F. (2001). Streinght training anatomy. Paris. Human Kinetics. 6. Dick, F. W. (1997). Sports Training Principles. London. A C Black. 7. Ellis J., J. Henderson (1997.). Trčanje bez ozljeda, Zagreb: Gopal. 8. Jukić, I., Marković. G. (2005.). Kondicijske vježbe s utezima. Zagreb. Kineziološki fakultet Sveučilišta u Zagrebu 9. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2000). Spolno prenosive bolesti, Reproduktivno zdravlje, Metode i sredstva za zaštitu od trudnoće, Zagreb. 10. Klinika za dječje bolesti Zagreb, Služba za reproduktivno zdravlje (2001). Kontracepcija - vodič kroz metode i sredstva za spriječavanje trudnoće, Zagreb. 11. Kulier, I (2003). Strategija mršavljenja, Zagreb: Impress. 12. Kulier, I. (2001). Što jedemo, Zagreb: Impress. 13. Medved, R. i suradnici (1987). Sportska medicina. Zagreb: Jumena. 14. Milanović, D. i suradnici (1997). Priručnik za sportske trenere. Zagreb: FFK 15. Mišigoj-Duraković, M. i sur. (1999). Tjelesno vježbanje i zdravlje. Zagreb: FFK 16. Mišigoj-Duraković, M., i suradnici (1995). Morfološka antropologija u športu. Zagreb. FFK 17. Špehar, N. (2014). Tjelesna aktivnost u funkciji zdravlja - nastavni materijal iz Tjelesne i zdravstvene kulture, dostupno online na web stranicama TVZ-a Obavijesti i informacije na internet adresi http://nastava.tvz.hr/tzk-GRO				
Students obligations	maximum of 3 absences from exercises				
Knowledge evaluation during semester	Redovitost pohaa#18#100#0\$Prakti rad#10#0#0\$				



Knowledge evaluation after semester	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.
Student activities:	Aktivnost (Classes attendance) ECTS 1
Remark	This course can not be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Kineziološka kultura II
ISVU equivalents:	32151;38174;85292;
Proposal made by	Natalija Špehar, Senior Lecturer

Code WEB/ISVU	23940/184753	ECTS	5.0	Academic year	2018/2019
Name	Market and Business Environment				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (14+0+16+0) 90
Teachers	Lectures:1. mr.sc. Časlav Dunović , viši predavač Auditory exercises:mr.sc. Časlav Dunović , viši predavač Seminar exercises: Brigitta Cafuta Seminar exercises: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 business environment.				
Learning outcomes:	1.define basic notions of economics for civil engineers. Level:6 2.identify elementary reproduction processes. Level:6 3.categorize business funds. Level:6 4.connect company with its environment. Level:6,7 5.classify business results. Level:6,7 6.define factors that influence company operations. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Discussion Other Appropriate teaching aids (video projector and computer) will be used to present, in an appropriate way, topics covered during the course.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other Cases from real life are analyzed, and instructions are given as necessary for preparation of the seminar paper.				
Methods of carrying out seminars	Other 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 content lectures	1.Business environment, notion of earning, 2h, Learning outcomes:1 2.Economic development indicators, factors influencing economic development, 2h, Learning outcomes:2,4 3.Technical structure of economy, 2h, Learning outcomes:2,6 4.Company, entrepreneur, entrepreneurship, 2h, Learning outcomes:4 5.Notion of company and its functions, 2h, Learning outcomes:2,4 6.Entrepreneur, 2h, Learning outcomes:4 7.Entrepreneurship, its meaning and role in construction industry, 2h, Learning outcomes:4 8.Company policies, establishment of policies, influence factors, 2h, Learning outcomes:3,4 9.Market, notion, function, structure, 2h, Learning outcomes:4 10.Market research, supply and demand, 2h, Learning outcomes:3,4 11.Law of supply and demand, reproduction process, 2h, Learning outcomes:2,5 12.Reproduction flow, input, output, 2h, Learning outcomes:2,5 13.Forms of investment in reproduction, 2h, Learning outcomes:2,3,5 14.Costs and calculations, supply, sale, 2h, Learning outcomes:3,5 15.Business success and business success indicators, 2h, Learning outcomes:6				
Course content auditory	1.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 on., 1h, Learning outcomes:2,4,5 2.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 on., 1h, Learning outcomes:2,4,5 3.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 on., 1h, Learning outcomes:2,4,5 4.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 on., 1h, Learning outcomes:2,4,5 5.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 on., 1h, Learning outcomes:2,4,5 6.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 on., 1h, Learning outcomes:2,4,5 7.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 on., 1h, Learning outcomes:2,4,5 8.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 on., 1h, Learning outcomes:2,4,5 9.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 on., 1h, Learning outcomes:2,4,5 10.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 on., 1h, Learning outcomes:2,4,5 11.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 on., 1h, Learning outcomes:2,4,5 12.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 on., 1h, Learning outcomes:2,4,5 13.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 on., 1h, Learning outcomes:2,4,5 14.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 on., 1h, Learning outcomes:2,4,5 15.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 on., 1h, Learning outcomes:2,4,5										
Course content seminars	1.No lessons, Learning outcomes:2,4,5 2.No lessons, Learning outcomes:2,4,5 3.No lessons, Learning outcomes:2,4,5 4.No lessons, Learning outcomes:2,4,5 5.No lessons, Learning outcomes:2,4,5 6.No lessons, Learning outcomes:2,4,5 7.No lessons, Learning outcomes:2,4,5 8.No lessons, Learning outcomes:2,4,5 9.No lessons, Learning outcomes:2,4,5 10.No lessons, Learning outcomes:2,4,5 11.No lessons, Learning outcomes:2,4,5 12.No lessons, Learning outcomes:2,4,5 13.No lessons, Learning outcomes:2,4,5 14.No lessons, Learning outcomes:2,4,5 15.No lessons, Learning outcomes:2,4,5										
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment										
Exam literature	Basic literature: 1. M.Katavić, Osnove ekonomije za graditelje, Hrvatska Sveučilišna naklada, Hrvatska udruga za organizaciju građenja, Zagreb, 2009. Additional literature: 1. J.E. Manser, Economics - a foundation course for the built environment , EFN Spon ,London ,UK 1995.										
Students obligations	maximum of 3 absences from exercises										
Knowledge evaluation during semester	Redovitost pohaa#5#0#60\$Kolokvij, teorijska pitanja#2#100#50\$										
Knowledge evaluation after semester	- presentation of seminar paper - oral examination (only for students who successfully presented the seminar paper)										
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>1</td></tr> <tr> <td>(Seminar Work)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	1	(Seminar Work)	1	(Written exam)	1	(Oral exam)	2
Aktivnost	ECTS										
(Classes attendance)	1										
(Seminar Work)	1										
(Written exam)	1										
(Oral exam)	2										
Remark	This course can not be used for final thesis theme										
Prerequisites:	Students cannot enroll in this course unless they have passed Matematika I Students cannot enroll in this course unless they have passed Nacrtna geometrija u graditeljstvu I Students cannot enroll in this course unless they have completed Sociologija rada										
ISVU equivalents:	22368;155973;										
Proposal made by	M.Sc.M.C.E. Časlav Dunović										

Code WEB/ISVU	22876/22319	ECTS	7.0	Academic year	2018/2019
Name	Mathematics I				
Status	1st semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				45+45 (45+0+0+0) 120
Teachers	Lectures:1. Ivana Božić Dragun dipl.prof.mat. Lectures:mr. sc. Reni Banov dipl. ing. mat. Lectures:dr.sc. Mandi Orlić Bachler v.pred Auditory exercises:mr. sc. Reni Banov dipl. ing. mat. Auditory exercises: Martina Benković Auditory exercises: Ivana Božić Dragun dipl.prof.mat. Auditory exercises:dr.sc. Mandi Orlić Bachler v.pred				
Course objectives	acquiring basic knowledge in vector algebra and differential calculus of real functions of a single real variable				
Learning outcomes:	1.distinguish between sets of natural, whole, rational and real numbers. Level:6 2.calculate sum, product and quotient of complex numbers. Level:6 3.find determinants of real matrices. Level:6 4.solve systems of linear algebraic equations. Level:6 5.distinguish between scalar and vector quantities. Level:6 6.find areas of polygons and volumes of polyhedrons by means of vector algebra. Level:6 7.determine equations of straight lines in plane. Level:6,7 8.determine equations of straight lines and planes in space. Level:6,7 9.determine inverse functions. Level:6 10.evaluate limits of functions. Level:6 11.find derivatives of functions. Level:6 12.determine tangents and normals on graphs of functions. Level:6,7 13.determine local extrema and inflection points of functions. Level:6 14.sketch graphs of functions. Level:6				
Methods of carrying out lectures	Ex cathedra teaching				
Methods of carrying out auditory exercises	Group problem solving				
Course content lectures	1.Real numbers, 3h, Learning outcomes:1 2.Complex numbers, 3h, Learning outcomes:2 3.Matrices and determinants, 3h, Learning outcomes:3 4.Systems of linear equations, 3h, Learning outcomes:4 5.Vectors, 3h, Learning outcomes:5 6.Scalar, vector and mixed product of vectors, 3h, Learning outcomes:6 7.Straight lines and planes, 3h, Learning outcomes:7,8 8.Midterm exam, 3h, Learning outcomes:1,2,3,4,5,6,7,8 9.Functions, 3h, Learning outcomes:9 10.Limits, 3h, Learning outcomes:10 11.Derivatives, 3h, Learning outcomes:11 12.Applications of derivatives, 3h, Learning outcomes:12 13.Local extrema and inflection points, 3h, Learning outcomes:13 14.Graph sketching, 3h, Learning outcomes:14 15.Final exam, 3h, Learning outcomes:9,10,11,12,13,14				
Course content auditory	1.Real numbers, 3h, Learning outcomes:1 2.Complex numbers, 3h, Learning outcomes:2 3.Matrices and determinants, 3h, Learning outcomes:3 4.Systems of linear equations, 3h, Learning outcomes:4 5.Vectors, 3h, Learning outcomes:5 6.Scalar, vector and mixed product of vectors, 3h, Learning outcomes:6 7.Straight lines and planes, 3h, Learning outcomes:7,8 8.Midterm exam, 3h, Learning outcomes:1,2,3,4,5,6,7,8 9.Functions, 3h, Learning outcomes:9 10.Limits, 3h, Learning outcomes:10 11.Derivatives, 3h, Learning outcomes:11 12.Applications of derivatives, 3h, Learning outcomes:12 13.Local extrema and inflection points, 3h, Learning outcomes:13 14.Graph sketching, 3h, Learning outcomes:14 15.Final exam, 3h, Learning outcomes:9,10,11,12,13,14				
Required materials	Basic: classroom, blackboard, chalk...				
Exam literature	1. S. Suljagić: Matematika I, skripta, 2005. http://nastava.tvz.hr/ssuljagic/ 2. M. Orlić, T. Perković: Repetitorij matematike za studente graditeljstva, TVZ, Zagreb, 2014. 3. I. Vuković: MATEMATIKA 1; Nakladnik: REDAK (2015.), ISBN: 978-953-336-241-0 Additional literature: 1. B. P. Demidovič i dr.: Zadaci i riješeni primjeri iz matematičke analize za tehničke fakultete, 7. ispravljeno izdanje, Golden marketing - Tehnička knjiga, Zagreb, 2003. 2. N. Elezović: Linearna algebra, Element, Zagreb, 1995. 3. N. Elezović, A. Aglič: Zbirka zadataka iz linearne algebre, Element, Zagreb, 1995. 4. L. Krnić, Z. Šikić: Račun diferencijalni i integralni, Školska knjiga, Zagreb, 1992. 5. S. Kurepa: Matematička analiza I, Tehnička knjiga, Zagreb, 1970.				



	6. Ž. Pauše: Zbirka teorijskih pitanja iz matematike za studente tehnike, Školska knjiga, Zagreb, 1995. 7. K. Singh: Engineering mathematics through applications, Palgrave Macmillan, 2003.										
Students obligations	It is required to achieve at least 30 points during the semester.										
Knowledge evaluation during semester	During the semester it is possible to achieve a maximum of 60 points, as follows: - course completed: 30 points, - tests: 30 points. By achieving at least 45 points, a student is qualified for the oral exam, which is obligatory										
Knowledge evaluation after semester	At the exam it is possible to achieve a maximum of 40 points. The exam consists of written (for students with less than 45 points achieved during the semester) and oral part.										
Student activities:	<table><tr><td>Aktivnost</td><td>ECTS</td></tr><tr><td>(Classes attendance)</td><td>1</td></tr><tr><td>(Constantly tested knowledge)</td><td>2</td></tr><tr><td>(Written exam)</td><td>2</td></tr><tr><td>(Oral exam)</td><td>2</td></tr></table>	Aktivnost	ECTS	(Classes attendance)	1	(Constantly tested knowledge)	2	(Written exam)	2	(Oral exam)	2
Aktivnost	ECTS										
(Classes attendance)	1										
(Constantly tested knowledge)	2										
(Written exam)	2										
(Oral exam)	2										
Remark	This course can not be used for final thesis theme										
Prerequisites:	No prerequisites.										
Proposal made by	Ivana Božić Dragun, Reni Banov										

Code WEB/ISVU	23349/147426	ECTS	6.0	Academic year	2018/2019
Name	Mathematics II				
Status	2nd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				45+30 (30+0+0+0) 105
Teachers	Lectures:1. mr. sc. Reni Banov dipl. ing. mat. Lectures:2. dr.sc. Mandi Orlić Bachler v.pred Lectures:3. Ivana Božić Dragun dipl.prof.mat. Auditory exercises:mr. sc. Reni Banov dipl. ing. mat. Auditory exercises: Ivana Božić Dragun dipl.prof.mat. Auditory exercises:dr.sc. Mandi Orlić Bachler v.pred				
Course objectives	acquiring basic knowledge on integral calculus of real functions of a single real variable, solving ordinary differential equations, and the corresponding numerical methods				
Learning outcomes:	1.distinguish between definite and indefinite integrals. Level:6 2.solve integrals using substitution and integration by parts. Level:6,7 3.solve integrals of rational functions. Level:6,7 4.distinguish between definite and improper integrals. Level:6 5.find areas using definite integrals. Level:6 6.find displacement, given velocity of straight line motion as a function of time. Level:6 7.find velocity, given acceleration of straight line motion as a function of time. Level:6 8.solve differential equations using separation of variables. Level:6 9.solve differential equations by lowering the order. Level:6 10.solve first and second order linear differential equations. Level:6 11.distinguish between exact and approximate solutions of mathematical problems. Level:6 12.approximately solve equations using Newton's method. Level:6 13.approximately solve definite integrals. Level:6 14.approximately solve differential equations with initial conditions. Level:6				
Methods of carrying out lectures	Ex cathedra teaching				
Methods of carrying out auditory exercises	Group problem solving				
Course content lectures	1.Definite and indefinite integral, 3h, Learning outcomes:1 2.Techniques for integration, 3h, Learning outcomes:2 3.Integration of rational functions, 3h, Learning outcomes:3 4.Definite and improper integral, 3h, Learning outcomes:4 5.Applications of integration in geometry, 3h, Learning outcomes:5 6.Applications of integration in mechanics, 3h, Learning outcomes:6,7 7.Midterm exam, 3h, Learning outcomes:1,2,3,4,5,6,7 8.Solving differential equations using separation of variables, 3h, Learning outcomes:8 9.Lowering the order of differential equations, 3h, Learning outcomes:9 10.Linear differential equations, 3h, Learning outcomes:10 11.Numerical methods, 3h, Learning outcomes:11 12.Numerical solution of equations, 3h, Learning outcomes:12 13.Interpolation of functions and numerical integration, 3h, Learning outcomes:13 14.Numerical solution of differential equations, 3h, Learning outcomes:14 15.Final exam, 3h, Learning outcomes:8,9,10,11,12,13,14				
Course content auditory	1.Definite and indefinite integral, 2h, Learning outcomes:1 2.Techniques for integration, 2h, Learning outcomes:2 3.Integration of rational functions, 2h, Learning outcomes:3 4.Definite and improper integral, 2h, Learning outcomes:4 5.Applications of integration in geometry, 2h, Learning outcomes:5 6.Applications of integration in mechanics, 2h, Learning outcomes:6,7 7.Midterm exam, 2h, Learning outcomes:1,2,3,4,5,6,7 8.Solving differential equations using separation of variables, 2h, Learning outcomes:8 9.Lowering the order of differential equations, 2h, Learning outcomes:9 10.Linear differential equations, 2h, Learning outcomes:10 11.Numerical methods, 2h, Learning outcomes:11 12.Numerical solution of equations, 2h, Learning outcomes:12 13.Interpolation of functions and numerical integration, 2h, Learning outcomes:13 14.Numerical solution of differential equations, 2h, Learning outcomes:14 15.Final exam, 2h, Learning outcomes:8,9,10,11,12,13,14				
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory				
Exam literature	1. S. Suljagić: Matematika II, skripta, 2006. http://nastava.tvz.hr/ssuljagic/ 2. M. Orlić, T. Perkov: Repetitorij matematike za studente graditeljstva, TVZ, Zagreb, 2014. Additional literature: 1. B. P. Demidovič i dr.: Zadaci i riješeni primjeri iz matematičke analize za tehničke fakultete, 7. ispravljeno izdanje, Golden marketing - Tehnička knjiga, Zagreb, 2003. 2. L. Krnić, Z. Šikić: Račun diferencijalni i integralni, Školska knjiga, Zagreb, 1992. 3. S. Kurepa: Matematička analiza I, Tehnička knjiga, Zagreb, 1970. 4. Ž. Pauše: Zbirka teorijskih pitanja iz matematike za studente tehnike, Školska knjiga, Zagreb, 1995. 5. K. Singh: Engineering mathematics through applications, Palgrave Macmillan, 2003.				



Students obligations	It is required to achieve at least 30 points during the semester.	
Knowledge evaluation during semester	During the semester it is possible to achieve a maximum of 60 points, as follows: - course completed: 30 points, - tests: 30 points. By achieving at least 45 points, a student is qualified for the oral exam, which is obligatory.	
Knowledge evaluation after semester	At the exam it is possible to achieve a maximum of 40 points. The exam consists of written (for students with less than 45 points achieved during the semester) and oral part.	
Student activities:	Aktivnost (Oral exam) (Written exam) (Classes attendance) (Constantly tested knowledge)	ECTS 2 1 1 2
Remark	This course can not be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have completed Matematika I Students cannot pass this course unless they have passed Matematika I	
ISVU equivalents:	22342;	
Proposal made by	Mandi Orlić Bachler, 14. 6. 2017.	

Code WEB/ISVU	23950/184763	ECTS	2.0	Academic year	2018/2019
Name	Methodology and Management in Civil Engineering				
Status	5th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (10+0+5+0) 30
Teachers	Lectures:mr.sc. Lucija Bačić v.pred. Auditory exercises:mr.sc. Lucija Bačić v.pred. Auditory exercises: Nataša Uzelac Seminar exercises:mr.sc. Lucija Bačić v.pred. Seminar exercises: Nataša Uzelac				
Course objectives	Acquiring the necessary knowledge, skills and behavior as a function of effective and efficient operation and management in the engineering profession.				
Learning outcomes:	1.connect basic concepts, concepts and processes of management. Level:6,7 2.assess the significance and impact of the elements of the external and internal environment on business. Level:6,7 3.analyze the planning, decision making and organizing function. Level:6 4.assess the role and importance of human resources management and leadership. Level:6,7 5.analyze the function of controlling. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other 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.				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming Other Presentation of problems and tasks relating to managerial profession and solving problems both individually and in teams.				
Methods of carrying out seminars	Traditional literature analysis Data mining and knowledge discovery on the Web Essay writing Discussion, brainstorming Interpretation and presentations of papers in areas of high interest to students.				
Course content lectures	1.Introductory lecture, methodology and operationalisation lectures and exercises, 1h, Learning outcomes:1 2.Basic principles of management, 1h, Learning outcomes:1 3. External and internal environment, 1h, Learning outcomes:1,2 4.Planning, 1h, Learning outcomes:1,3 5.Decision making, 1h, Learning outcomes:1,3 6.Organizing, 1h, Learning outcomes:1,3 7.1. Preliminary exam, 1h, Learning outcomes:1,2,3 8.Human resources management (1), 1h, Learning outcomes:1,4 9.Human resources management (2), 1h, Learning outcomes:1,4 10.Leading, 1h, Learning outcomes:1,3 11.Controlling, 1h, Learning outcomes:1,5 12.Human relations, communication and conflict solving , 1h, Learning outcomes:1,3,4 13.Ethics and social responsibility, 1h, Learning outcomes:1,2,4 14.Specificity of management in Civil Engineering, 1h, Learning outcomes:1,2,3,4,5 15.2. Preliminary exam, 1h, Learning outcomes:1,4,5				
Course content auditory	1.Group discussion, 1h, Learning outcomes:1,2,3,4,5 2.Group discussion, 1h, Learning outcomes:1 3.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,2 4.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,3 5.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,3 6.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,3 7.No classes 8.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,4 9.No classes 10.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,3 11.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,3,4 12.No classes 13.No classes 14.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,2,3,4,5 15.No classes				
Course content seminars	1.No classes 2.No classes 3.No classes 4.No classes 5.No classes				

	6.No classes 7.Essay presentation and group discussion , 1h, Learning outcomes:1,2,3 8.No classes 9.Essay presentation and group discussion , 1h, Learning outcomes:1,2,3 10.No classes 11.No classes 12.Essay presentation and group discussion , 1h, Learning outcomes:4,5 13.Essay presentation and group discussion , 1h, Learning outcomes:4,5 14.No classes 15.Essay presentation and group discussion , 1h, Learning outcomes:1,2,3,4,5						
Required materials	Basic: classroom, blackboard, chalk... Overhead projector						
Exam literature	Sikavica, P., Bahtijarević-Šiber, F., Pološki Vokić, N. (2008.), Temelji menadžmenta, Školska knjiga, Zagreb Medanić, B. (1997), Management u građevinarstvu, Građevinski fakultet, Osijek Buble, M. (2006), Menadžment, Ekonomski fakultet, Split						
Students obligations	Attend 70% of classes and exercises.						
Knowledge evaluation during semester	Regularity of attendance and activity in lectures and exercises 15%. Presentation of seminar work or essay 15%. 1. and 2. preliminary exam 70%. Max. 10 points: 10 excellent (5) 8 9 very good (4) 6 7 good (3) 5 sufficient (2) 0 4 fail (1)						
Knowledge evaluation after semester	Written exam 70%. Max. 10 points: 10 excellent (5) 8 9 very good (4) 6 7 good (3) 5 sufficient (2) 0 4 fail (1)						
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	1	(Written exam)	1
Aktivnost	ECTS						
(Classes attendance)	1						
(Written exam)	1						
Remark	This course can not be used for final thesis theme						
Prerequisites:	Students cannot enroll in this course unless they have passed Sociologija rada Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Tržište i poslovno okruženje						
ISVU equivalents:	22366;155945;						
Proposal made by	Lucija Bačić, MSc, senior lekturer						

Code WEB/ISVU	23452/155960	ECTS	6.0	Academic year	2018/2019
Name	Organization of Construction Site				
Status	5th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+45 (15+0+0+30) 105
Teachers	Lectures:1. mr.sc. Petar Adamović prof.v.škole Lectures:v.predavač Boris Uremović dipl.ing.građ. Auditory exercises: Domagoj Šojat struč.spec.ing.aedif. Auditory exercises:v.predavač Boris Uremović dipl.ing.građ. Construction exercises: Domagoj Šojat struč.spec.ing.aedif. Construction exercises:v.predavač Boris Uremović dipl.ing.građ.				
Course objectives	Acquiring knowledge on site organisation in preparation for construction work				
Learning outcomes:	1.plan necessary logistic, technical, technological, and organizational resources for the organization and realization of on-site works. Level:6,7 2.calculate quantities of material resources needed for the realization of on-site works. Level:6 3.devise possible alternatives for organizing technological and logistical on-site construction processes. Level:6,7 4.combine possible alternatives for organizing technological and logistical on-site construction processes. Level:6,7 5.define an optimum alternative for organizing technological and logistical on-site construction processes. Level:6,7 6.correlate construction processes and resources on the construction site. Level:6,7 7.produce the obligatory Work Plan for the construction site. Level:6,7 8.conduct site establishment and site preparation activities, and make preparations for on-site construction works in accordance with regulations. Level:6,7 9.correlate planned construction resources during on-site realization of works. Level:6,7 10.organize the technique, technology and logistics of the construction process, and safety at work on the construction site. Level:6,7 11.re-examine achievements during realization of on-site works. Level:6,7 12.identify problems encountered during conduct of on-site works, namely with regard to logistics and organization of such works. Level:6 13.solve problems encountered during conduct of on-site works, namely by improving logistics and organization of such works. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Discussion Questions and answers Other 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.				
Methods of carrying out auditory exercises	Group problem solving				
How construction exercises are held	Group problem solving Other Students will independently solve problems as needed for their assignment ("site organisation plan").				
Course content lectures	1.Construction, 2h, Learning outcomes:1,6,7 2.Construction resources, 2h, Learning outcomes:2,9 3.Structures and construction sites, 2h, Learning outcomes:1,3,4,5 4.Structures and construction sites, 2h, Learning outcomes:1,3,4,5,6,7 5.organiisation of construction and construction sites, 2h, Learning outcomes:1,3,4,5,6,7,8,9,11,12,13 6.Regulations concerning construction sites, 2h, Learning outcomes:7,8,12,13 7.Planning works on the construction site, 2h, Learning outcomes:6,8,9,10 8.Preparation of construction site, 2h, Learning outcomes:8,10 9.Field trip visit to a construction site, 2h, Learning outcomes:3,4,5,8,10,12,13 10.Field trip visit to a construction site, 2h, Learning outcomes:3,4,5,8,10,11,12,13 11.Construction site logistics, 2h, Learning outcomes:2,3,4,5,10,11,12,13 12.Construction plants and installations, 2h, Learning outcomes:3,4,5,6,8,10 13.Construction site diagrams, 2h, Learning outcomes:3,4,5,10,12,13 14.Construction site documents, 2h, Learning outcomes:7,8,10 15.Construction site documents, 2h, Learning outcomes:7,10				
Course content auditory	1.Site disposition and layout plan with all necessary calculations and drawings: On-site services and temporary roads, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 2.Planning internal transport on the construction site, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 3.Distribution of manufacturing plants and construction machinery, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 4.Calculation of storage space, defining and planning temporary on-site structures, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 5.Cost estimate for preliminary work, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 6.Time schedule for the realization of preliminary works on a construction site, 2h, Learning outcomes:7,8,9,10,11,12,13 7.no classes, 2h 8.no classes, 2h 9.no classes, 2h 10.no classes, 2h 11.no classes, 2h 12.no classes, 2h 13.no classes, 2h 14.no classes, 2h				

	15.no classes, 2h								
Course content constructs	1.no classes, 2h 2.no classes, 2h 3.no classes, 2h 4.no classes, 2h 5.no classes, 2h 6.no classes, 2h 7.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h 8.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h 9.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h 10.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h 11.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h 12.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h 13.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h 14.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h 15.Students independently prepare the program assignment: (Preliminary) design of organisation (and preparation) of a construction site, 2h								
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment								
Exam literature	Basic literature: 1. J. Marušić: Organizacija građenja, Sveučilište u Zagrebu, 1994. Additional literature: 1.www.tvz.hr - Građevinski strojevi - Pridruženi dokumenti 1. knjiga: Knjige o građevinskim strojevima o "Učinak građevinskih strojeva"; o "Postrojenja za proizvodnju građiva, I.dio, Drobilane, Tvornice betona (betonare), Asfaltna baze (asfaltna postrojenja)"; o Izbor strojeva i planiranje strojnog rada u građenju 2. knjiga: o "Tehnologija građenja I, Zemljani radovi". 3. knjiga: o "Sustavi građevinskih strojeva" 2.Zdravko Linarić : Leksikon strojeva i opreme za proizvodnju građevinskih materijala, učinci građevinskih strojeva i vozila pri zemljanim radovima, biblioteka Mineral, Business Media Croatia d.o.o., Zagreb, 2007. 3.Rudolf Lončarić: Organizacija graditeljskih projekata , Sveučilište u Zagrebu, Zagreb, 1995.								
Students obligations	maximum of 3 absences from exercises								
Knowledge evaluation during semester	Redovitost pohaa#10#0#60\$Kolokvij, numeri zadaci#1#50#60\$Kolokvij, teorijska pitanja#1#50#60\$Programski zadatak#1#100#100\$								
Knowledge evaluation after semester	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)								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Project)</td><td>3</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Project)	3	(Written exam)	1	(Oral exam)	2
Aktivnost	ECTS								
(Project)	3								
(Written exam)	1								
(Oral exam)	2								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have completed Građevinski strojevi Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Tržište i poslovno okruženje Students cannot pass this course unless they have passed Građevinski strojevi								
ISVU equivalents:	22365;								
Proposal made by	mr.sc. Petar Adamović, 17.9.2018								

Code WEB/ISVU	22881/22336	ECTS	5.0	Academic year	2018/2019
Name	Physics				
Status	2nd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (15+15+0+0) 90
Teachers	Lectures:1. prof.vis.šk. Ivica Levanat Lectures:2. Alemka Knapp Auditory exercises: Alemka Knapp Laboratory exercises:prof.dr. Dubravko Horvat Laboratory exercises: Diana Šaponja-Milutinović dipl.ing.fizike, pred.				
Course objectives	Students will understand physical phenomena and quantities used in the study of civil engineering described within a broader context of the basic laws of physics.				
Learning outcomes:	1.calculate simple rectilinear and circular motions. Level:6 2.calculate translational acceleration of a body influenced by forces. Level:6 3.correlate action of forces with changes in kinetic and potential energy of a body. Level:6,7 4.differentiate traditional-mechanical description of motion from special relativity. Level:6 5.compare gravitational, electric and magnetic field. Level:6,7 6.analyze electric currents and voltages in simple direct current circuits. Level:6 7.calculate pressure in liquid and buoyancy. Level:6 8.draw a harmonic vibration sketch. Level:6 9.correlate heat and temperature, and heat transfer mechanisms. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Discussion Questions and answers Other 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.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Interactive problem solving Other 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.				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Group problem solving Other Measurement of physical quantities which illustrate physical laws introduced in the lectures. Analysis of the measurements results.				
Course content lectures	1.Physical quantities and units., 2h, Learning outcomes:1,2,3 2.Use of differential calculus., 2h, Learning outcomes:1,2,3 3.Rectilinear motion, free fall., 2h, Learning outcomes:1 4.Circular motion, rotation., 2h, Learning outcomes:1 5.Newton axioms., 2h, Learning outcomes:2 6.Work and power., 2h, Learning outcomes:3 7.Kinetic and potential energy., 2h, Learning outcomes:3 8.Einstein relativity, energy and matter., 2h, Learning outcomes:4 9.Law of gravity, field, potential., 2h, Learning outcomes:5 10.Electric force and voltage, current., 2h, Learning outcomes:5,6 11.Magnetic field, electromagnetic induction., 2h, Learning outcomes:5 12.Hydrostatics: pressure and buoyancy., 2h, Learning outcomes:7 13.Bernoulli equation., 2h, Learning outcomes:7 14.Harmonic oscillations., 2h, Learning outcomes:8 15.Heat and temperature, heat transfer., 2h, Learning outcomes:9				
Course content auditory	1.No session. 2.Rectilinear motion., 2h, Learning outcomes:1 3.No session. 4.Free fall. Vertical , 1h, Learning outcomes:1 Circular motion, 1h, Learning outcomes:1 5.No session. 6.Newton axioms., 2h, Learning outcomes:2,3 7.No session. 8.Newton aksioms., 1h, Learning outcomes:2,3 Work, energy and power., 1h, Learning outcomes:3 9.1. partial exam, 1h, Learning outcomes:1,2,3,4 10.Gravitational and electric field., 1h, Learning outcomes:5 DC circuits., 1h, Learning outcomes:6 11.No session. 12.DC circuits., 1h, Learning outcomes:6 Hydrostatics and hydrodynamics , 1h, Learning outcomes:7 13.No session.				

	14. Harmonic oscillations., 1h, Learning outcomes:8 Heat and temperature, heat transfer, 1h, Learning outcomes:9 15.2. partial exam, 1h, Learning outcomes:5,6,7,8,9						
Course content laboratory	1. Schedule and preparation., 1h 2. No lab. 3. Measurement and analysis of results., 2h 4. No lab. 5. Density of solid body., 2h, Learning outcomes:7 6. No lab. 7. Density of alcohol., 2h, Learning outcomes:7 8. No lab. 9. Spiral spring law., 2h, Learning outcomes:8 10. No lab. 11. Torsion pendulum., 2h, Learning outcomes:8 12. No lab. 13. Joule law., 2h, Learning outcomes:9 14. No lab. 15. Power of alternating current., 2h, Learning outcomes:6						
Required materials	Basic: classroom, blackboard, chalk... Special purpose laboratory Whiteboard with markers Overhead projector						
Exam literature	Basic literature: 1. Levanat, I., Fizika za TVZ Kinematika i dinamika, TVZ, Zagreb, 2010. 2. Kulišić, P., Mehanika i toplina, Školska knjiga, Zagreb, 2005. Additional literature: 1. Young Freedman, University Physics, Addison Wesley, San Francisco, 2007. 2. Kuzmanović, B., Osnove elektrotehnike 1, Element, Zagreb, 2001.						
Students obligations	Positive report from laboratory exercises.						
Knowledge evaluation during semester	Two partial exams, each with numerical problems and theoretical questions. Minimum to pass each partial exam: theory 40%, problems 50%. For attending lectures, up to 10% of theory maximum added.						
Knowledge evaluation after semester	Full exam, with numerical problems and theoretical questions. Minimum to pass: 40% problems and 40% theory.						
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>3</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Written exam)	3	(Oral exam)	2
Aktivnost	ECTS						
(Written exam)	3						
(Oral exam)	2						
Remark	This course can not be used for final thesis theme						
Prerequisites:	Students cannot pass this course unless they have completed Matematika I						
Proposal made by	prof. vis. šk. Ivica Levanat , 03. 03. 2014.						

Code WEB/ISVU	23445/155943	ECTS	6.0	Academic year	2018/2019
Name	Planning Methods				
Status	6th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+45 (15+0+0+30) 105
Teachers	Lectures:1. mr.sc. Časlav Dunović , viši predavač Auditory exercises: Nina Šantek struč.spec.ing.aedif., predavač Auditory exercises: Domagoj Šojat struč.spec.ing.aedif. Auditory exercises:v.predavač Boris Uremović dipl.ing.građ. Construction exercises: Nina Šantek struč.spec.ing.aedif., predavač Construction exercises: Domagoj Šojat struč.spec.ing.aedif. Construction exercises: Sanela Vojnović mag.ing.aedif				
Course objectives	The aim of the course is to teach students about planning techniques and time scheduling for construction work, including all necessary resources.				
Learning outcomes:	1.distinguish between individual project planning methods. Level:6 2.specify basic project planning terms. Level:6 3.identify all phases in a construction project. Level:6 4.categorise project planning and monitoring tasks. Level:6 5.use advance software tools to create basic time schedule with resources plan. Level:6,7 6.prepare basic time schedule for the monitoring and inspection process. Level:6,7 7.define project participants as related to the project planning and monitoring process. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Discussion Questions and answers Appropriate teaching aids (video projectors and computers) will be used during lectures.				
Methods of carrying out auditory exercises	Laboratory exercises, computer simulations Group problem solving Discussion, brainstorming Computer simulations Workshop Other 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	Laboratory exercises, computer simulations Group problem solving Discussion, brainstorming Computer simulations Workshop Other 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 content lectures	1.Role of planning in construction process, 2h, Learning outcomes:2 2.Approaches and concepts, 2h, Learning outcomes:1,2 3.Plan and planning requirements , 2h, Learning outcomes:2 4.Plans - classification and types, 2h, Learning outcomes:2 5.Objectives, principles and methodology for elaboration of plans, 2h, Learning outcomes:2 6.Input parameters and values relevant for the elaboration of plans, 2h, Learning outcomes:3,4,5 7. Time scheduling technique using methods CPM, Pert and PDM, and the scope of application, 2h, Learning outcomes:1,5 8. Time scheduling technique using methods CPM, Pert and PDM, and the scope of application, 2h, Learning outcomes:1,5 9. Work phases and definition of plan elaboration activities , 2h, Learning outcomes:3,5 10.Optimization and control of realization, 2h, Learning outcomes:5,6,7 11.Primjena kompjuterskih programa u planiranju, 2h, Learning outcomes:5,6,7 12. Basic principles of planning with the MS Project software package, 2h, Learning outcomes:5,6,7 13. Basic principles of planning with the MS Project software package, 2h, Learning outcomes:5,6,7 14.Management of resources (costs, labour, machines) , 2h, Learning outcomes:5,6,7 15.Management of resources (costs, labour, machines) , 2h, Learning outcomes:5,6,7				
Course content auditory	1.Introduction to MS Project and overview of basic commands, 1h, Learning outcomes:5,6,7 2.Using MS Project to create a plan (Gantt chart), entering activities, entering data for appropriate activities, duration of activities, 2h, Learning outcomes:5,6,7 3.Grouping activities, type of connections, establishing and changing connections among activities, time reserves, identification of critical path, Gantt chart changing, preparation for printing, 2h, Learning outcomes:5,6,7 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, 2h, Learning outcomes:5,6,7 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 , 1h, Learning outcomes:5,6,7 6.Plan analysis and harmonization, plan harmonization and plan shortening strategies, solving problems related to the excessive use of resources (1)., 1h, Learning outcomes:5,6,7 7.Laboratory exercises, 2h, Learning outcomes:3,5,6 8.Laboratory exercises, 2h, Learning outcomes:3,5,6 9.Laboratory exercises, 2h, Learning outcomes:3,5,6 10.Laboratory exercises, 2h, Learning outcomes:3,5,6 11.Laboratory exercises, 2h, Learning outcomes:3,5,6				

	12.Laboratory exercises, 2h, Learning outcomes:3,5,6 13.Laboratory exercises, 2h, Learning outcomes:3,5,6 14.Laboratory exercises, 2h, Learning outcomes:3,5,6 15.Laboratory exercises, 2h, Learning outcomes:3,5,6
Course content constructs	1.Oral Exercises, 2h, Learning outcomes:5,6,7 2.Oral Exercises, 2h, Learning outcomes:5,6,7 3.Oral Exercises, 2h, Learning outcomes:5,6,7 4.Oral Exercises, 2h, Learning outcomes:5,6,7 5.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 6.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 7.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 8.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 9.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 10.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 11.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 12.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 13.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 14.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6 15.Independent preparation of an operative construction plan (planning time, resources, and costs) in an electronic format, using the MS Project software package., 2h, Learning outcomes:3,5,6
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector Video equipment Special equipment 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.
Exam literature	Basic literature: 1. B. Uremović, Č. Dunović: Upravljanje projektima uz pomoć programskog alata Microsoft Project 2007, Priručnici Tehničkog veleučilišta u Zagrebu, Zagreb 2010. 2. M.Radujković i suradnici: Planiranje i kontrola projekta, Udžbenici Sveučilišta u Zagrebu, Zagreb, 2012. Additional literature: 1. S.Nonveiller: Metode mrežnog planiranja i njihova primjena u rukovođenju građenjem, GF Zagreb, Zagreb 1982. 2. J. Branderberg, R. Konrad: Tehnika mrežnog planiranja, Tehnička knjiga, Zagreb 1970. 3. J. Marušić: Organizacija građenja, Sveučilište u Zagrebu, 1994. 4. MS Project Users guide
Students obligations	maximum of 3 absences from exercises
Knowledge evaluation during semester	Redovitost pohaa#5#0#60\$Kolokvij, numeri zadaci#1#50#60\$Kolokvij, teorijska pitanja#1#50#60\$Programski zadatak#1#0#100\$
Knowledge evaluation after semester	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)
Student activities:	Aktivnost (Written exam) ECTS 4 (Oral exam) 2
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have completed Organizacija građenja I
ISVU equivalents:	22364;147445;
Proposal made by	M.Sc.M.C.E. Časlav Dunović



Code WEB/ISVU	23925/184653	ECTS	5.0	Academic year	2018/2019
Name	Prefabricated Structures				
Status	5th semester - Building Construction (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (16+0+14+0) 90
Teachers	Lectures:mr.sc. Jure Galić predavač Lectures:dr.sc. Krunoslav Pavković dipl.ing.grad. Auditory exercises:dr.sc. Krunoslav Pavković dipl.ing.grad. Auditory exercises: Šime Serdarević mag. ing. aedif.				
Course objectives	Students will acquire basic knowledge about prefabricated construction systems and related construction technologies.				
Learning outcomes:	1.present various prefabricated structural systems. Level:6,7 2.propose a rational structural system depending on the occupancy of the building. Level:6,7 3.draw required structural elements of the building. Level:6 4.propose assembly method and organisation of assembly work, and select assembly devices. Level:6,7 5.propose technology for the fabrication of structural elements. Level:6,7				
Methods of carrying out lectures	Real life diagrams relating to the design, fabrication and assembly work, are presented through drawings, photographs and video recordings.				
Methods of carrying out auditory exercises	Group problem solving Other Presentation of structures via drawings, with explanations.				
Methods of carrying out seminars	Group problem solving Other Students are required to prepare a seminar paper for a selected building, including photographs and drawings.				
Course content lectures	1.Introduction, 2h, Learning outcomes:1 2.Industrial construction techniques: advantages and shortcomings, 2h, Learning outcomes:1 3.Prefabricated reinforced concrete structures: Large area systems, skeleton systems, spatial systems, and mixed systems , 6h, Learning outcomes:1,3 4.Systems made of lightweight concrete and brick, 2h, Learning outcomes:1,2 5.Typical prefabricated structures made of steel, wood and artificial materials, 4h, Learning outcomes:1,2,3 6.Roofs and facade systems, 2h, Learning outcomes:1,2 7.Glass/steel composite systems. Membrane structures: textile - steel, 2h, Learning outcomes:2,3 8.Residential houses based on wood and steel, 2h, Learning outcomes:1 9.Assembly of structures: sequence, mechanical plant, scaffolds, 4h, Learning outcomes:4 10.Presentation of completed structures made of concrete, steel, and wood , 4h, Learning outcomes:1,2 11.- 12.- 13.- 14.- 15.-				
Course content auditory	1.General remarks about subject and dynamics. Description of assignment. , 2h, Learning outcomes:1,5 2. Preparations for seminar paper, 4h, Learning outcomes:1,2,5 3.Selection of structure for seminar paper (team work: 5 student teams), 4h, Learning outcomes:1,2 4.Joint visit to three construction sites - field practice, 6h, Learning outcomes:1,2 5.- 6.- 7.- 8.- 9.- 10.- 11.- 12.- 13.- 14.- 15.-				
Course content seminars	1.Seminar paper on a defined building/structure, with relevant descriptions, drawings and photographs. The paper will be presented to the entire class. The presentation will be followed by active discussion of students and lecturers, 10h, Learning outcomes:2,3,4 2.Students presentation, 4h, Learning outcomes:1,2,3,4,5 3.- 4.- 5.- 6.- 7.- 8.- 9.- 10.- 11.- 12.- 13.- 14.- 15.-				

Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Portable overhead projector Video equipment Preparation of structural drawings with typical details.								
Exam literature	Basic literature: 1. S. Rex: INDUSTRIJSKI NAČIN GRAĐENJA, Građ. Fak. u Zagrebu, 1981., 2. S. Rex: INDUSTRIJSKI NAČIN GRAĐENJA II DIO - MONTAŽNO GRAĐENJE, Građ. Fak. u Zagrebu, 1983., Additional literature: 1. F. Kind-Barkauskas, B. Kauhsen, S. Polonyi, J. Brandt: CONCRETE CONSTRUCTION MANUAL, Birkhauser E. 2002. 2. C. Schittich, G. Staib, D. Balkow, M. Schuler, W. Sobek: GLASS CONSTRUCTION MANUAL, Birkhauser Edition Detail, 1998. 3. T. Herzog, R. Krippner, W. Lang: FACADE CONSTRUCTION MANUAL, Birkhauser Edition Detail, 2004. 4. G. Pfeifer, R. Ramcke, J. Achtiger, K. Zilch: MASONRY CONSTRUCTION MANUAL, Birkhauser Edition Detail, 2001. 5. Klaus-Michael Koch: BAUEN MIT MEMBRANEN, Izdavač: Prestel Verlag, 2004, ISBN: 3-7913-3048-9								
Students obligations	Seminar paper. Maximum of 3 absences from exercises.								
Knowledge evaluation during semester	Seminar paper.								
Knowledge evaluation after semester	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.								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Activity in class)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Activity in class)	1	(Oral exam)	2	(Written exam)	2
Aktivnost	ECTS								
(Activity in class)	1								
(Oral exam)	2								
(Written exam)	2								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have passed Betonske konstrukcije I Students cannot enroll in this course unless they have completed Metalne konstrukcije Students cannot enroll in this course unless they have completed Drvene konstrukcije Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have completed Betonske konstrukcije II								
ISVU equivalents:	22387;155946;								

Code WEB/ISVU	23952/184765	ECTS	5.0	Academic year	2018/2019
Name	Project Management and Legislation				
Status	5th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (16+0+14+0) 90
Teachers	Lectures:1. mr.sc. Petar Adamović prof.v.škole Lectures:2. v.predavač Boris Uremović dipl.ing.grad. Auditory exercises:mr.sc. Petar Adamović prof.v.škole Auditory exercises: Domagoj Šojat struč.spec.ing.aedif. Seminar exercises:mr.sc. Petar Adamović prof.v.škole Seminar exercises: Domagoj Šojat struč.spec.ing.aedif.				
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.				
Learning outcomes:	1.analyse all phases of a building construction project. Level:6 2.list required documentation and documents needed in individual phases of a project. Level:6 3.anticipate participants and processes in individual phases of a project. Level:6,7 4.organise procurement of all necessary permits (location permit, building permit, use permit...). Level:6,7 5.make preparations for the purchase and contracting. Level:6,7 6.plan site-documentation management. Level:6,7 7.manage a building construction process. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other Appropriate teaching aids (video projector and computer) are used as needed during the lectures.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other Administrative documents and documentation relating to completed structures/projects are presented, explained and commented on.				
Methods of carrying out seminars	Group problem solving Data mining and knowledge discovery on the Web Discussion, brainstorming Other The final result of auditory exercises is the seminar paper.				
Course content lectures	1.Introduction, terms, definitions, 2h, Learning outcomes:1 2.Construction regulations, regulations aimed at protecting public interest, 2h, Learning outcomes:1,2 3.Sudionici u projektu , 2h, Learning outcomes:3 4.Systemic approach, construction as a project, 2h, Learning outcomes:1,2,3,4 5.Activities for the delivery of the location permit , 2h, Learning outcomes:3 6.Location permit, investment study, decision, 2h, Learning outcomes:3,4 7.Technical documentation, building permit, 2h, Learning outcomes:2,3,4 8. Procurement and award of works, 2h, Learning outcomes:5 9.Construction site documents, 2h, Learning outcomes:2,3,4,6 10.Financial documents and payment of work , 2h, Learning outcomes:2,3,4,6 11.Technical supervision, inspections, 2h, Learning outcomes:7 12.Final account , 2h, Learning outcomes:6,7 13.Technical supervision, inspections, 2h, Learning outcomes:4,5,6 14.Safety at work, safety measures , 2h, Learning outcomes:1,2 15.Quality assurance, 2h, Learning outcomes:1,2,7				
Course content auditory	1.Topics and elements relating to the field of project management, 1h, Learning outcomes:1,2 2.administrative documents and documentation, 1h, Learning outcomes:1,2 3.preliminary investigations, 1h, Learning outcomes:3 4.preliminary investigations, 1h, Learning outcomes:3,6 5.investment documents, 1h, Learning outcomes:2,3 6.investment documents, 1h, Learning outcomes:2,3 7.location permit, 1h, Learning outcomes:2,3 8.building permit, 1h, Learning outcomes:2,3 9.site documents, 1h, Learning outcomes:2,3,4,6 10.site documents, 1h, Learning outcomes:6 11.site documents, 1h, Learning outcomes:6 12.as-built documents, 1h, Learning outcomes:5,6 13.as-built documents, 1h, Learning outcomes:5,6 14.as-built documents, 1h, Learning outcomes:5,6 15.operating permit, 1h, Learning outcomes:7				
Course content seminars	1.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 2.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 3.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 4.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7				

	5.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 6.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 7.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 8.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 9.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 10.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 11.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 12.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 13.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 14.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7 15.Students make and present seminars with topics from building codes and regulations, 1h, Learning outcomes:1,2,3,4,5,6,7								
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment								
Exam literature	Basic literature: 1. Zakon o građenju 2. Skendrović, V. : Upravljanje projektima, Informator, Zagreb, 1986 Additional literature: 1. Simić-Bosanac: Građevinska regulativa; Centar za informacije i publicitet, Zagreb 1978								
Students obligations	maximum of 3 absences from exercises								
Knowledge evaluation during semester	Redovitost pohaa#5#0#60\$Kolokvij, teorijska pitanja#2#40#60\$Seminarski rad#1#10#60\$Usmena provjera znanja#1#50#60\$								
Knowledge evaluation after semester	- presentation of seminar paper - oral examination (only for students who successfully presented the seminar paper)								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Seminar Work)</td><td>2</td></tr> <tr> <td>(Oral exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Written exam)	2	(Seminar Work)	2	(Oral exam)	1
Aktivnost	ECTS								
(Written exam)	2								
(Seminar Work)	2								
(Oral exam)	1								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have completed Tržište i poslovno okruženje Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Matematika II								
ISVU equivalents:	22369;155970;								
Proposal made by	mr.sc. Petar Adamović, prof.v.škole, 17.9.2018								

Code WEB/ISVU	23928/184720	ECTS	5.0	Academic year	2018/2019
Name	Public Roads I				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (12+0+0+18) 90
Teachers	Lectures:1. doc.dr.sc. Miroslav Šimun dipl.ing.građ. Auditory exercises: Sandra Mihaljinac mag.ing.aedif. Auditory exercises:doc.dr.sc. Miroslav Šimun dipl.ing.građ. Construction exercises: Sandra Mihaljinac mag.ing.aedif. Construction exercises:doc.dr.sc. Miroslav Šimun dipl.ing.građ.				
Course objectives	The course is intended to provide basic theoretical and practical knowledge about the design, construction and maintenance of roads.				
Learning outcomes:	1.analyse space in which the road structure is designed, and define input parameters for geometry calculations. Level:6 2.formulate design program depending on design stages from conceptual design to detailed design. Level:6,7 3.izračunati geometrijske sastavnice tlocrta i nacrti cestovnog objekta.. Level:6 4.classifying materials for roads bulding. Level:6 5.correctness of pavement surface by criterion of drainage. Level:6 6.compare alternative solutions based on the minimum earthworks criterion. Level:6,7 7.lead design work for a road structure. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Simulations Modelling Discussion Questions and answers 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.				
Methods of carrying out auditory exercises	Group problem solving				
How construction exercises are held	Other Each student will prepare an assignment (a shortened version of preliminary design for a road).Situation 1: 2000, longitudinal profile, normal transverse profile, characteristic transverse profiles and technical description.				
Course content lectures	1.Basic concepts - Introduction, 2h, Learning outcomes:1,7 2.Characteristics of vehicle movement, elements and classification of roads, 2h, Learning outcomes:1 3.Cross section geometry of roads , 2h, Learning outcomes:3,4 4.Plan geometry of roads, 2h, Learning outcomes:3 5.Elements of stake out, Geodetic Information Systems in designing, 2h, Learning outcomes:3 6.Vertical projection of roads, 2h, Learning outcomes:3 7.SPACE TRACING, 2h, Learning outcomes:3 8.ROAD DRAINAGE, 2h, Learning outcomes:5 9.ROAD DRAINAGE - CULVERTS, 2h, Learning outcomes:5 10.Road building materials, 2h, Learning outcomes:4 11. Road structure and quantities, 2h, Learning outcomes:1,5 12.Road structure - earth work, 2h, Learning outcomes:4 13.Road structure - walls, 2h, Learning outcomes:1,6 14.Road pavement - pavement structure, 2h, Learning outcomes:4,5 15.Road Intersections, 2h, Learning outcomes:1				
Course content auditory	1.Introduction, tasks division and interpretation of making the zero line, 2h, Learning outcomes:1 2.Interpretation of making the zero line and tracing road axis, 2h, Learning outcomes:1,3 3.Interpretation tracing road axis, 1h, Learning outcomes:3,7 No lessons, 1h 4.No lessons, 2h 5.No lessons, 2h 6.Interpretation of tracing the road in vertical projection, 2h, Learning outcomes:3,7 7.Interpretation of tracing the road in vertical projection, 1h, Learning outcomes:3,7 No lessons, 1h 8.Interpretation of tracing the road in vertical projection, 1h, Learning outcomes:3,7 No lessons, 1h 9.No lessons, 2h 10.No lessons , 2h 11.Interpretation of making a normal cross section, 1h, Learning outcomes:3 No lessons , 1h 12.No lessons, 2h 13.Interpretation of making transverse profiles and interpretation of making technical description, 1h, Learning outcomes:3 No lessons, 1h 14.Interpretation how to submit a program, 1h, Learning outcomes:2 No lessons, 1h 15.No lessons, 2h				
Course content constructs	1.No lessons, 2h 2.No lessons, 2h 3.No lessons, 1h Making the zero line with ACAD tool, 1h, Learning outcomes:3,4 4.Making road axis in plan with ACAD tool, 2h, Learning outcomes:3,4				

	5. Making road axis in plan with ACAD tool, 2h, Learning outcomes:3,4 6. No lessons, 2h 7. No lessons, 1h Creating the vertical projection of the road with ACAD tool, 1h, Learning outcomes:3,4 8. No lessons, 1h Creating the vertical projection of the road with ACAD tool, 1h, Learning outcomes:3,4 9. Creating the vertical projection of the road with ACAD tool, 2h, Learning outcomes:3,4 10. Creating the vertical projection of the road with ACAD tool, 2h, Learning outcomes:3,4 11. No lessons, 1h Creating a normal cross section of the road with ACAD tool, 1h, Learning outcomes:3,4 12. Creating a normal cross section of the road with ACAD tool, 2h, Learning outcomes:3,4 13. No lessons, 1h Creating a characteristic later profiles of the road with ACAD tool, 1h, Learning outcomes:3,4 14. No lessons, 1h Creating a technical description, 1h, Learning outcomes:1 15. Control and delivery of programs, 2h, Learning outcomes:1								
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector Video equipment								
Exam literature	1. Korlaet, Ž.; Uvod u projektiranje i građenje cesta, udžbenik, Sveučilište u Zagrebu, Zagreb 1995. g. 2. Dragčević, V., Korlaet, Ž. Osnove projektiranja cesta, Sveučilište u Zagrebu, Zagreb 2003.								
Students obligations	maximum of 3 absences from exercises								
Knowledge evaluation during semester	Regular attendance#10#0#50\$, numerical tasks#1#50#50\$, theoretical issues#1#50#50\$Program Task#1#0#100\$								
Knowledge evaluation after semester	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.								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	1	(Written exam)	2	(Oral exam)	2
Aktivnost	ECTS								
(Classes attendance)	1								
(Written exam)	2								
(Oral exam)	2								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot pass this course unless they have passed Geodezija Students cannot enroll in this course unless they have passed Nacrtna geometrija u graditeljstvu II Students cannot enroll in this course unless they have completed Geodezija								
ISVU equivalents:	22355;155928;								
Proposal made by	Ph.D.Asst.Prof.C.E. Miroslav Šimun, 22.2.2016								

Code WEB/ISVU	23432/155929	ECTS	5.0	Academic year	2018/2019
Name	Public Roads II				
Status	5th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+0+20) 90
Teachers	Lectures: doc.dr.sc. Miroslav Šimun dipl.ing.grad. Auditory exercises: Sandra Mihalina mag.ing.aedif. Auditory exercises: doc.dr.sc. Miroslav Šimun dipl.ing.grad. Construction exercises: Sandra Mihalina mag.ing.aedif. Construction exercises: doc.dr.sc. Miroslav Šimun dipl.ing.grad.				
Course objectives	Students will acquire extensive theoretical and practical knowledge about road construction and maintenance activities.				
Learning outcomes:	1.classify soil materials in which earthworks are carried out. Level:6,7 2.calculate earthwork quantities and transport distances. Level:6 3.draw systems for the evacuation of ground and surface waters, and slope protection systems. Level:6 4.protect crown of an infrastructure facility by walls. Level:6 5.conduct earthworks for infrastructure facilities. Level:6,7 6.organize realization of earthworks. Level:6,7 7.classify layers and type pavement structure. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Modelling Discussion Questions and answers 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.				
Methods of carrying out auditory exercises	Group problem solving Other				
How construction exercises are held	Other Students will independently prepare a preliminary design for a road, examine slope stability and create a plan of culvert.				
Course content lectures	1.Basic concepts - introduction, 2h, Learning outcomes:1,6 2.Selection of road section, 2h, Learning outcomes:1,2 3.Methods of soil classification, 2h, Learning outcomes:1 4.Previous works in the construction of roads, 2h, Learning outcomes:1 5.Choice of slope inclination and slope protection, 2h, Learning outcomes:1,4 6.Making cut and kerf, 2h, Learning outcomes:1,2 7.Embankments making, 2h, Learning outcomes:1,2 8.Control test and criteria, 2h, Learning outcomes:5 9.Surface drainage, 2h, Learning outcomes:3 10.Underground drainage, 2h, Learning outcomes:3 11.Culvert, 2h, Learning outcomes:3 12.Support structures and their stability, 2h, Learning outcomes:4 13.Types of support structures -Walls, 2h, Learning outcomes:4,5 14.Mass calculation, balance and transport, 2h, Learning outcomes:2 15.Making pavement structure, 2h, Learning outcomes:7				
Course content auditory	1.Introduction, task division and interpretation of characteristic transverse profiles, 2h, Learning outcomes:1 2.No lessons, 2h 3.No lessons, 2h 4.No lessons, 2h 5.Interpreting the Geo Slope and creating a normal cross-profile, 2h, Learning outcomes:2 6.No lessons, 2h 7.No lessons, 2h 8.No lessons, 2h 9.Interpretation drafting culvert, 2h, Learning outcomes:3 10.No lessons, 2h 11.No lessons, 2h, Learning outcomes:6 12.Interpretation of the calculation masses line, 2h, Learning outcomes:2 13.No lessons, 2h 14.Interpretation making of technical description and how to submit a programme, 2h, Learning outcomes:6 15.No lessons, 2h				
Course content constructs	1.No lessons, 2h 2.Creating characteristic transverse profiles, 2h, Learning outcomes:2 3.Creating characteristic transverse profiles, 2h, Learning outcomes:2 4.Creating characteristic transverse profiles, 2h, Learning outcomes:2 5.No lessons, 2h 6.Calculation a slope stability of embankments, 2h, Learning outcomes:1,5 7.Calculation a slope stability of cut, 2h, Learning outcomes:1,5 8.Creating normal transverse profile, 2h, Learning outcomes:1,5 9.No lessons, 2h 10.Creating a plan of culvert, 2h, Learning outcomes:3 11.Creating a longitudinal section of culvert, 2h, Learning outcomes:3				

	12.No lessons, 2h 13.Creating a mass line, 2h, Learning outcomes:2 14.No lessons, 2h 15.Control and delivery of programs, 2h, Learning outcomes:6,7								
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector Video equipment								
Exam literature	Basic literature: 1.Dragčević, V., Rukavina, T., Donji ustroj prometnica, Sveučilište u Zagrebu, Zagreb 2006. 2.Dragčević, V., Korlaet, Ž. Osnove projektiranja cesta, Sveučilište u Zagrebu, Zagreb 2003. Additional literature: 1.Opći tehnički uvjeti za radove na cestama, Hrvatske ceste i Hrvatske autoceste, Zagreb, 2001 god. 2.Tehnički uvjeti za asfaltne kolnike, Hrvatske ceste, Zagreb 2015.								
Students obligations	maximum of 3 absences from exercises								
Knowledge evaluation during semester	Regular attendance#10#0#50\$, theoretical issues#2#100#60\$Program task#1#0#100\$								
Knowledge evaluation after semester	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)								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Classes attendance)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Classes attendance)	1	(Written exam)	2	(Oral exam)	2
Aktivnost	ECTS								
(Classes attendance)	1								
(Written exam)	2								
(Oral exam)	2								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have completed Ceste I Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Hidrologija i hidraulika Students cannot pass this course unless they have passed Ceste I								
ISVU equivalents:	22371;								
Proposal made by	Miroslav Šimun, Ph.D.Asst.Prof.C.E., 22.6.2016								

Code WEB/ISVU	23476/155986	ECTS	6.0	Academic year	2018/2019
Name	Railways				
Status	6th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+45 (6+0+0+39) 105
Teachers	Lectures:1. mr.sc. Ante Goran Bajić viši predavač Auditory exercises:mr.sc. Ante Goran Bajić viši predavač Construction exercises: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, plants and facilities.				
Learning outcomes:	1.analyse basic problems in the organisation of railway transport and operation of railways. Level:6 2.establish similarities and differences between traditional tracks and continuous welded rail tracks with an accent on forces and stresses in the track. Level:6 3.otkriti osnovne elemente željezničke pruge, praktična znanja za građenje i održavanje željez. pruga. Level:6,7 4.identify special structures in the track (turnouts) types, differences and problems in use. Level:6 5.calculate unannulled lateral acceleration, superelevation in curves, and transition ramp lengths in transition curves. Level:6 6.calculate all horizontal elements of turnout connection in train station, and draw a working drawing of stakeout on the scale of 1:500. Level:6 7.calculate factor of safety for vehicle passing through a curve of given horizontal elements. Level:6 8.calculate all track turning elements and make a stakeout drawing. Level:6				
Methods of carrying out lectures	Other 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.				
Methods of carrying out auditory exercises	Other Instructions, numerical examples, and regulations.				
How construction exercises are held	Other students independently solve problems for the assignment.				
Course content lectures	1.Forces acting on the track (static and dynamic - vertical and horizontal), introduction to calculation of permanent way, Winkler, assumptions, load diagram, dynamic coefficient, subbase coefficient - c), 2h, Learning outcomes:3 2. Permanent way elements (applicable tests, standards and CR byelaws): 1. Rails: Rail testing. Quality number K. Rails in use. Continuous dynamic tensile strength of steel. Breakdown. Fatigue. Wear (vertical, lateral, undulating, folded), grease guns, 2h, Learning outcomes:3 3.2. Rail accessories: Technical, operational, economic and other properties of rail accessories. Testing technical properties of connection accessories. Testing technical parameters of glued insulating joints, 2h, Learning outcomes:3 4.3. Sleepers: Assignments. Classification according to structural solution and material. Tests, standards and byelaws used at Croatian Railways, 2h, Learning outcomes:3 5.4. Ballast: Thickness. Calculation. Stress diagram (sleeper - formation). Ballast quality testing. Tests, standards and byelaws used by Croatian Railways, 2h, Learning outcomes:3 6.Turnouts: Classification of turnouts. Contour drawings of simple turnouts. Parts. Geometrical relationships, 2h, Learning outcomes:4 7.Maintenance of turnouts. Calculation of turnout connections., 2h, Learning outcomes:4 8.First preliminary exam, 2h 9. Track layout in straight line and in curve. (Track in straight line regulations. Track in curve regulations). Derivation of non-annulled lateral acceleration for high-speed railways. Track direction regulations., 2h, Learning outcomes:5 10.Works on track and systematisation of works. Classification of regular works. Works on geometry. Works on replacement. Big works (overhaul) organisation and layout plan of railway repair shed., 2h, Learning outcomes:1,5 11.Machines, outputs and organisation (ballast tamper, screen, plough). Repair of truck substructure. Cranes for replacement. Replacement train. Track maintenance works., 2h, Learning outcomes:1,5 12.Track welding. ET-weld. Welding machine. Phases of work. Weld testing. Advantages and shortcomings. AT-weld. Chemical analysis. Phases of work. Weld testing. Advantages and shortcomings. Comparison of AT and ET welds in actual use., 2h, Learning outcomes:2 13.Continuous welded rail (DT): Advantages and realization requirements. History. Forces and stresses in DT. Temperature in DT. Critical and safe temperature. Breathing end of DT. Track release. Longitudinal resistance - p. Lateral resistance - w. Three methods for alleviating internal stress from continuous rails (track lifting)., 2h, Learning outcomes:2 14. Special railways. Introduction. Funiculars. Rack railways. Aerial ropeways. Steel wire cable. Spiral cable. Ribbon cable. Alternating traffic. Directional traffic. Diagrams., 2h, Learning outcomes:4 15.Second - final preliminary exam, 2h				
Course content auditory	1.Instructions, numerical examples and regulations for solving problems in the scope of structural exercises: Turnouts: Classification of turnouts. Contour drawings of simple turnouts. Parts. Geometrical relationships. Calculation of turnout connections. s., 2h, Learning outcomes:6 2.Instructions, numerical examples and regulations for solving problems in the scope of structural exercises, 2h, Learning outcomes:7 3.Instructions, numerical examples and regulations for solving problems in the scope of structural exerciseTrack layout in straight line and in curve. (Track in straight line regulations. Track in curve regulations). Derivation of non-annulled lateral acceleration for high-speed railways. s., 2h, Learning outcomes:8 4.- 5.- 6.- 7.- 8.- 9.- 10.-				

	11.- 12.- 13.- 14.- 15.-
Course content constructs	1.1. Each student is given a different assignment and is required to independently rehabilitate the existing turnout links in full accordance with regulations applied by Croatian Railways., 3h, Learning outcomes:6 2.1. Each student is given a different assignment and is required to independently rehabilitate the existing turnout links in full accordance with regulations applied by Croatian Railways., 3h, Learning outcomes:6 3.1. Each student is given a different assignment and is required to independently rehabilitate the existing turnout links in full accordance with regulations applied by Croatian Railways., 3h, Learning outcomes:6 4.1. Each student is given a different assignment and is required to independently rehabilitate the existing turnout links in full accordance with regulations applied by Croatian Railways., 3h, Learning outcomes:6 5.1. Each student is given a different assignment and is required to independently rehabilitate the existing turnout links in full accordance with regulations applied by Croatian Railways., 3h, Learning outcomes:6 6.1. Each student is given a different assignment and is required to independently rehabilitate the existing turnout links in full accordance with regulations applied by Croatian Railways., 3h, Learning outcomes:6 7.2. Relocation of station tracks from zone /a/ to zone /b/, with the scale 1:500 stakeout plan , 3h, Learning outcomes:8 8.2. Relocation of station tracks from zone /a/ to zone /b/, with the scale 1:500 stakeout plan , 1h, Learning outcomes:8 9.2. Relocation of station tracks from zone /a/ to zone /b/, with the scale 1:500 stakeout plan , 3h, Learning outcomes:8 10.. Rehabilitation of existing curves to enable higher speeds of travel , 3h, Learning outcomes:7 11.. Rehabilitation of existing curves to enable higher speeds of travel , 3h, Learning outcomes:7 12. Production of the following drawings: railway cross-section (various alternatives and combinations), 2h, Learning outcomes:1,3 13.Production of the following drawings: sleeper to rail connection (various alternatives and combinations , 2h, Learning outcomes:1,3 14.Production of the following drawings: attachment accessories (supported or hanging) , 2h, Learning outcomes:1,3 15.Production of the following drawings: cross-section of rails typically used by Croatian Railways , 2h, Learning outcomes:1,3
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Portable overhead projector Video equipment
Exam literature	Basic literature: 1. Stipetić, A.: Gornji ustroj željezničkoga kolosijeka, FPZ, Zagreb, 2008. 2. Pollak, B.: ŽELJEZNICE, Građevinski institut, FGZ, Zagreb, 1988. 3. Bajić, A.G.: Separati predavanja. Additional literature: 1. P-314 PRAVILNIK O GORNJEM USTROJU, Hrvatske željeznice, Zagreb 2. P-315 PRAVILNIK O DONJEM USTROJU, Hrvatske željeznice, Zagreb
Students obligations	maximum of 3 absences from exercises
Knowledge evaluation during semester	Redovitost pohaa#20#0#80\$Kolokvij, teorijska pitanja#2#100#50\$Programski zadatak#4#0#100\$
Knowledge evaluation after semester	5th Semester: assignment submittal is a precondition for second signature 6th Semester: assignment submittal is a precondition for second signature written part of the examination (theory) and solution to the numerical assignment (turnout link calculation) - after the 6th semester oral part of the examination (may be taken only by students who acquired at least 60 points during the written part of the examination)
Student activities:	Aktivnost (Project) ECTS 6
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have completed Osnove željeznica Students cannot pass this course unless they have passed Osnove željeznica
ISVU equivalents:	22370;

Code WEB/ISVU	23460/155969	ECTS	5.0	Academic year	2018/2019
Name	Regulation and Amelioration Drainage				
Status	5th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (8+0+0+22) 90
Teachers	Lectures: Ivana Bartolić , pred. Lectures: dr.sc. Mladen Petrićec dipl.ing.grad. Auditory exercises: Filip Kalinić mag. ing. aedif. Auditory exercises: Dejan Kovačević dipl.ing.grad. Construction exercises: Filip Kalinić mag. ing. aedif. Construction exercises: Dejan Kovačević dipl.ing.grad.				
Course objectives	Students will learn basic operating principles for systems and structures used in watercourse regulation and drainage improvement practices, and will be able to conduct basic hydraulic calculations.				
Learning outcomes:	1.analyze the basic characteristics of water regulation. Level:6 2.prepare basic hydrological data for the design of water control structures. Level:6,7 3.calculate the basic hydraulic parameters of water control and structures. Level:6 4.identify the basic components of hydro-technical amelioration. Level:6 5.prepare a basis for the design of hydro-technical amelioration. Level:6,7 6.calculate the parameters of simple melioration drainage system and irrigation. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other 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.				
Methods of carrying out auditory exercises	Discussion, brainstorming Workshop Other Instructions for segments of individual program preparation.				
How construction exercises are held	Traditional literature analysis Data mining and knowledge discovery on the Web Workshop Other Students independently prepare a program, under lecturer				
Course content lectures	1.Purpose, problems and objective of regulation, role of regulation in water management , 1h, Learning outcomes:1 River bed morphology , 1h, Learning outcomes:1 2.River bed morphology , 1h, Learning outcomes:1 Hydrological characteristics of natural watercourses, water regime, sediment regime, ice regime, 1h, Learning outcomes:1,2 3.Hydraulic calculations for natural and artifical watercourses; flow calculations, sediment transport, bed stability , 2h, Learning outcomes:1,2 4.Hydraulic calculations for natural and artifical watercourses; flow calculations, sediment transport, bed stability , 2h, Learning outcomes:1,2 5.Hydraulic calculations for natural and artifical watercourses; flow calculations, sediment transport, bed stability , 1h, Learning outcomes:2,3 Regulation works on watercourse bed, regulation structures , 1h, Learning outcomes:3 6.Regulation works on watercourse bed, regulation structures , 2h, Learning outcomes:3 7.The protection and defense of river flooding, 2h, Learning outcomes:3 8.I. preliminary exam., 2h, Learning outcomes:1,2,3 9.Amelioration drainage demands, purpose, objective, 1h, Learning outcomes:4 Surface drainage, preconditions and demand , 1h, Learning outcomes:4 10.Amelioration drainage canals, main geometrical and hydraulic elements , 1h, Learning outcomes:4,5 Determination of crop-irrigation requirement and total flow, sizing of amelioration drainage canals , 1h, Learning outcomes:2 11.Structures on amelioration drainage canals and road network, 1h, Learning outcomes:4,5 Technology of construction of surface amelioration drainage systems , 1h, Learning outcomes:4,5 12.Subsurface drainage, preconditions and demand , 1h, Learning outcomes:5 Sizing of subsurface amelioration drainage systems, pipe drainage, 1h, Learning outcomes:5 13.Main geometrical and hydraulic elements of subsurface drainage systems , 1h, Learning outcomes:5 Materials and technology of construction of subsurface amelioration drainage systems, 1h, Learning outcomes:5,6 14.Types and methods of irrigation systems. Standard and crop-irrigation requirement , 1h, Learning outcomes:5,6 Structures of hydroamelioration systems for irrigation , 1h, Learning outcomes:5,6 15.II. preliminary exam, 2h, Learning outcomes:4,5,6				
Course content auditory	1.Instructions for making the task of regulation of watercourses., 2h, Learning outcomes:1,2,3 2.Instructions for making the task of regulation of watercourses, 2h, Learning outcomes:1,2,3 3.No lessons. 4.No lessons. 5.No lectures. 6.No lectures. 7.No lectures. 8.Instructions for making the task of amelioration., 2h, Learning outcomes:4,5,6 9.Instructions for making the task of amelioration., 2h, Learning outcomes:4,5,6				

	10.No lectures. 11.No lectures. 12.No lectures. 13.No lectures. 14.No lectures. 15.No lectures.
Course content constructures	1.No lectures. 2.No lectures. 3.No lectures. 4.No lectures. 5.Hydraulic calculation for boundary canal bed, 2h, Learning outcomes:1 6.Hydraulic calculation for boundary canal bed, 2h, Learning outcomes:1 7.Explanation and completion of the task., 2h, Learning outcomes:1,2,3 8.No lessons. 9. No lessons. 10. Making the task of amelioration., 2h, Learning outcomes:4,5,6 11.Making the task of amelioration., 2h, Learning outcomes:4,5,6 12.Making the task of amelioration., 2h, Learning outcomes:4,5,6 13.Making the task of amelioration., 2h, Learning outcomes:4,5,6 14.Making the task of amelioration., 2h, Learning outcomes:4,6 15.Explanation and completion of the task, 2h, Learning outcomes:4,5,6
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector Video equipment
Exam literature	Basic literature: 1. Priručnik 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 2. Živko Vuković: Osnove hidrotehnike, Prvi dio, druga knjiga Additional literature: 1. Josip Marušić: Separati iz površinske i podzemne odvodnje i navodnjavanja
Students obligations	Regular attendance and achieved results of prelim and favorably rated programs.
Knowledge evaluation during semester	Regular attendance and achieved results of prelim and favorably rated programs. All students achieved the conditions for the signature to be placed on the final exam.
Knowledge evaluation after semester	The exam consists of written and oral part. For the oral exam required to achieve 60% success in the written part of the exam
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have completed Vodogradnje Students cannot enroll in this course unless they have passed Osnove hidrologije i hidraulike Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Hidrologija i hidraulika Students cannot pass this course unless they have passed Vodogradnje Students cannot pass this course unless they have passed Hidrologija i hidraulika
ISVU equivalents:	22373;
Proposal made by	Docent Danko Holjević, Docent Danko Biondić 28.09.2015.



Code WEB/ISVU	23462/155971	ECTS	6.0	Academic year	2018/2019
Name	River Engineering				
Status	6th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+45 (21+0+9+15) 105
Teachers	Lectures:1. dr.sc. Mladen Petrić dipl.ing.grad. Lectures: Ivana Bartolić , pred. Auditory exercises: Ivana Bartolić , pred. Seminar exercises: Ivana Bartolić , pred. Construction exercises:dr.sc. Darko Barbalić dipl.ing.grad. Construction exercises: Ivana Bartolić , pred.				
Course objectives	Previously acquired knowledge in hydrology, hydrogeology, psammology, river morphology, environmental protection, inland water ecology, and other traditional civil engineering disciplines, will be correlated and extended so as to enable students to implement engineering solutions on natural watercourses in accordance with the society's demands and needs in terms of the use and protection of natural watercourses and their lowlands, and protection from adverse effects of water, such as floods, water-caused soil erosion, undesirable sediment deposits, etc.				
Learning outcomes:	1.to identify the possibilities to use natural watercourse.. Level:6 2.to analyze the basis for the management of natural watercourses.. Level:6 3.calculate the basic hydrological, morphological and sediment parameters watercourses.. Level:6 4.to determine the flow regime, sediment transport and morphological changes in watercourse.. Level:7 5.to evaluate the basic parameters of regulating natural watercourse.. Level:7 6.to establish basic measures for flood protection along the natural waterways.. Level:7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers 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.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Computer simulations Solving exercises on the blackboard, with active student participation.				
Methods of carrying out seminars	Workshop Other				
How construction exercises are held	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming Workshop Preparation of a program in groups, under lecturer				
Course content lectures	1.Introduction to the content of teaching and exams., 1h Definitions, scope and principles of river engineering., 1h, Learning outcomes:1 2.Conditions and aspects of river use., 2h, Learning outcomes:1 3.Methods for collecting data on hydrological and morphological properties of watercourses., 2h, Learning outcomes:1 4.Hydrological, morphological, ecological and other analysis. , 2h, Learning outcomes:2 5.Hydraulic calculations and analysis. , 2h, Learning outcomes:3 6. Use of model in the analysis of flow along natural watercourses., 2h, Learning outcomes:3 7.Improvement and regulation of natural watercourses. , 2h, Learning outcomes:3,4 8.Improvement and regulation of natural watercourses. , 2h, Learning outcomes:4 9.I. preliminary exam, 2h, Learning outcomes:1,2,3 10. Regulation of flow and water level in natural watercourses., 2h, Learning outcomes:5 11. Hydraulic structures in river engineering., 2h, Learning outcomes:5 12. Hydraulic structures in river engineering., 2h, Learning outcomes:5 13.High water level management and flood protection., 2h, Learning outcomes:6 14.High water level management and flood protection., 1h, Learning outcomes:6 Multipurpose water systems., 1h, Learning outcomes:6 15.II. preliminary exam., 2h, Learning outcomes:4,5,6 Repeated I. or II. preliminary exam, 2h, Learning outcomes:1,2,3,4,5,6				
Course content auditory	1.Introduction to the way the content the modes of implementation exercises., 1h Characteristics of natural watercourses, river use conditions and modalities, background information for engineering interventions., 2h, Learning outcomes:1,2 2.Hydrological, psammologic, morphologic measurements and data analysis., 3h, Learning outcomes:1,2 3.Calculation of water face and riverbed stability., 3h, Learning outcomes:3 4.Morphologic regulations, modifications and channel routing. , 3h, Learning outcomes:4,5 5.River reservoirs and retarding basins, use of river flood retention areas, flood protection systems., 3h, Learning outcomes:5,6 6.No lessons. 7.No lessons. 8.No lessons. 9.No lessons. 10.The presentation and explanation I. program., 2h, Learning outcomes:2,3,4 11.No lessons. 12.No lessons. 13.No lessons.				

	14.No lessons. 15.The presentation and explanation II. program, 3h, Learning outcomes:4,5,6	
Course content seminars	1.No lessons. 2.No lessons. 3.No lessons. 4.No lessons. 5.No lessons. 6.Zadavanje i obrazloenje naa rjeavanja i sadraja I. programa., 3h, Learning outcomes:3,4 7.Zadavanje i obrazloenje naa rjeavanja i sadraja I. programa., 1h, Learning outcomes:3,4 8.No lessons. 9.No lessons. 10.Zadavanje i obrazloenje naa rjeavanja i sadraja II. programa, 1h, Learning outcomes:5,6 11.Zadavanje i obrazloenje naa rjeavanja i sadraja II. programa., 3h, Learning outcomes:5,6 12.No lessons. 13.No lessons. 14.No lessons. 15.No Lessons.	
Course content constructures	1.No lessons. 2.No lessons. 3.No lessons. 4.No lessons. 5.No lessons. 6.No lessons. 7.Working on the I. task., 2h, Learning outcomes:2,3,4 8.Working on the I. task., 3h, Learning outcomes:2,3,4 9.Working on the I. task., 3h, Learning outcomes:2,3,4 10.No lessons. 11.No lessons. 12.Working on the II. task., 3h, Learning outcomes:5,6 13.Working on the II. task., 3h, Learning outcomes:5,6 14.Working on the II. task., 3h, Learning outcomes:5,6 15.No lessons.	
Required materials	General purpose computer laboratory Whiteboard with markers Overhead projector	
Exam literature	Basic literature: 1. Mladen Petrićec: Riječno inženjerstvo - interne skripte, Zagreb 2011. 2. Miroslav Đurović: Regulacije rijeka, Tehnička knjiga, Zagreb 1967. 3. Zoran Barbačić: Riječna hidrotehnika - regulacije rijeka, skripte, Građevinski fakultet Sarajevo 1989. Additional literature: 1. P. Ph. Jensen i suradnici: Principles of River Engineering, Pitman Pub., London, 1979. 2. Dragutin Muškatirović: Regulacije reka, Građevinski fakultet Beograd, 1976. 3. Ven To Chow: Open Channel Hydraulics, MacGraw-Hill, 1959. 4. Ognjen Bonacci: Ekohidrologija vodnih resursa i otvorenih vodotoka, Građevinsko-arhitektonski fakultet, Split, 2003.	
Students obligations	Attendance of lectures and exercises. It is necessary to achieve 30 or more points score through activities during the semester (preliminary exams, seminars,...).	
Knowledge evaluation during semester	Through activities during the semester a student can achieve 30-60 points score. Student who achieve more than 15 and less than 30 points score is allowed to write additional test. If student achieve minimum of 30 points score or more, student is allowed to take final exam. Student who achieve less than 15 mark points during semester in the next year must enrol the subject again.	
Knowledge evaluation after semester	Final exam, by which student can achieve 40 points score, is obligatory for all subjects. For a positive final exam evaluation it is required 20 points score (50%). The final subject mark contains points achieved during the semester and on final exam as a percentage of acquired knowledge and skills as follows: 90 - 100 - A 80 - 89.9 - B 65 - 79.9 - C 60 - 64.9 - D 50 - 59.9 - E	
Student activities:	Aktivnost (Constantly tested knowledge) (Oral exam)	ECTS 3 3
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have completed Hidrologija i hidraulika Students cannot pass this course unless they have passed Hidrologija i hidraulika Students cannot enroll in this course unless they have passed Vodogradnje Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Matematika II	
ISVU equivalents:	147447;	
Proposal made by	dr.sc. Mladen Petrićec, prof. v. šk.	



Code WEB/ISVU	23466/155975	ECTS	5.0	Academic year	2018/2019
Name	Safety at Work				
Status	6th semester - Management in Civil Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+0+20) 90
Teachers	Lectures: dr.sc. Dražen Arbutina dipl.ing.arh. Lectures: Zdravko Muratti Auditory exercises: Zdravko Muratti Auditory exercises: v.predavač Boris Uremović dipl.ing.građ. Construction exercises: Zdravko Muratti Construction exercises: v.predavač Boris Uremović dipl.ing.građ.				
Course objectives					
Remark	This course can not be used for final thesis theme				
Prerequisites:	Students cannot enroll in this course unless they have completed Organizacija građenja I				
ISVU equivalents:	147446;				



Code WEB/ISVU	23939/184743	ECTS	2.0	Academic year	2018/2019
Name	Sociology				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+15 (5+0+10+0) 30
Teachers	Lectures:mr.sc. Lucija Bačić v.pred. Auditory exercises:mr.sc. Lucija Bačić v.pred. Auditory exercises: Nataša Uzelac Seminar exercises:mr.sc. Lucija Bačić v.pred. Seminar exercises: Nataša Uzelac				
Course objectives	Understanding and gaining knowledge about laws, relationships and processes through the economic and sociological aspect of work, also through the relation of people, work and organization in society, in theory and practice				
Learning outcomes:	1.identify the fundamental theoretical terms, principles and concepts of sociology of work and organization. Level:6 2.analyze theories of labor organization as well as various modern concepts related to the characteristics of work, organization and society. Level:6 3.examine the main characteristics of the labor market and the impact that globalization has on it as well as on the modern trends in business and labor organization. Level:6 4.determine the importance of ethics and social responsibility, as well as the influence of the dark side of management and human behavior. Level:7 5.critically analyze modern problems and trends in the field of work transformation and its organization. Level:7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming				
Methods of carrying out seminars	Traditional literature analysis Data mining and knowledge discovery on the Web Essay writing Discussion, brainstorming Interpretation and presentations of papers in areas of high interest to students.				
Course content lectures	1.Introductory lecture, methodology and operationalisation lectures and exercises, 1h, Learning outcomes:1 2.Defining basic concepts and looking at work through an economic and sociological context, 1h, Learning outcomes:1,2 3.Historical overview of the characteristics of work, organization of work and society, 1h, Learning outcomes:2 4.The elements and characteristics of labor market, 1h, Learning outcomes:3 5.Structuring of production and division of labor, 1h, Learning outcomes:2,3 6.Managing Employees, 1h, Learning outcomes:2,3,4,5 7.1. Preliminary exam, 1h, Learning outcomes:1,2,3,4 8.Planning, recruitment and selecting applicants, 1h, Learning outcomes:2,3,4 9.Motivation and organizational behavior, 1h, Learning outcomes:2,3,4,5 10.Compensation and reward system, 1h, Learning outcomes:2,3,4,5 11.Specificity of work in Civil Engineering, 1h, Learning outcomes:2,3,4,5 12.Ethics and social responsibility, 1h, Learning outcomes:4,5 13.The dark side of management and human behavior, 1h, Learning outcomes:4,5 14.Globalization and modern business trends and transformation of work, 1h, Learning outcomes:2,3,4,5 15.2. Preliminary exam, 1h, Learning outcomes:1,2,3,4,5				
Course content auditory	1.Group discussion, 1h, Learning outcomes:1,2,3,4,5 2.No classes 3.No classes 4.No classes 5.No classes 6.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,2,3,4,5 7.No classes 8.No classes 9.No classes 10.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:2,3,4,5 11.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:2,3,4,5 12.No classes 13.No classes 14.Interpretation practical examples, group discussion and proposals to solve problems, 1h, Learning outcomes:1,2,3,4,5 15.No classes				
Course content seminars	1.No classes 2.Essay presentation and group discussion, 1h, Learning outcomes:1,2 3.Essay presentation and group discussion, 1h, Learning outcomes:2 4.Essay presentation and group discussion, 1h, Learning outcomes:2,3 5.Essay presentation and group discussion, 1h, Learning outcomes:2,3 6.No classes 7.Essay presentation and group discussion, 1h, Learning outcomes:2,3,4,5				

	8.Essay presentation and group discussion, 1h, Learning outcomes:2,3,4 9.Essay presentation and group discussion, 1h, Learning outcomes:2,3,4 10.No classes 11.No classes 12.Essay presentation and group discussion, 1h, Learning outcomes:1,2,3,4,5 13.Essay presentation and group discussion, 1h, Learning outcomes:1,2,3,4,5 14.No classes 15.Essay presentation and group discussion, 1h, Learning outcomes:1,2,3,4,5	
Required materials	Basic: classroom, blackboard, chalk... Overhead projector	
Exam literature	Robbins, S. P., Judge, T. A. (2009), Organizacijsko ponašanje, MATE, Zagreb Giddens, A. (2007), Sociologija, Nakladni zavod Globus, Zagreb Beck, U. (2000), The Brave New World of Work, Polity Press, Cambridge	
Students obligations	Attendance 70% of classes and exercises.	
Knowledge evaluation during semester	Regularity of attendance and activity in lectures and exercises 15%. Presentation of seminar work or essay 15%. 1. and 2. preliminary exam 70%. Max. 10 points: 10 excellent (5) 8 9 very good (4) 6 7 good (3) 5 sufficient (2) 0 4 fail (1)	
Knowledge evaluation after semester	Written exam 70%. Max. 10 points: 10 excellent (5) 8 9 very good (4) 6 7 good (3) 5 sufficient (2) 0 4 fail (1)	
Student activities:	Aktivnost (Classes attendance) (Written exam)	ECTS 1 1
Remark	This course can not be used for final thesis theme	
Prerequisites:	No prerequisites.	
ISVU equivalents:	22343;163659;	
Proposal made by	Lucija Bačić, MSc, senior lekturer	

Code WEB/ISVU	23926/184718	ECTS	5.0	Academic year	2018/2019
Name	Soil Mechanics				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (0+4+2+24) 90
Teachers	Lectures:1. dr.sc. Sonja Zlatović , profesor visoke škole Lectures:2. mr.sc. Željko Lebo v. pred. Laboratory exercises:dr.sc. Sonja Zlatović , profesor visoke škole Seminar exercises:dr.sc. Sonja Zlatović , profesor visoke škole Construction exercises: Ivana Pavlić Construction exercises:dr.sc. Sonja Zlatović , profesor visoke škole				
Course objectives	Understand the soil behaviour principles and prepare for solving of geotechnical problems.				
Learning outcomes:	1.identify soil. Level:6 2.classify soil. Level:6,7 3.calculate effective stress in horizontally stratified soil without water flow or with vertical flow. Level:6 4.estimate settlement of horizontally stratified soil due to uniformly distributed load or water level change. Level:6,7 5.estimate strength parameters according to Mohr-Coulomb criterion based on direct shear results. Level:6,7 6.identify causes of slope instability. Level:6 7.calculate factor of safety for sliding by using the infinite slope model or GeoSlope software in different conditions. Level:6 8.estimate stability of an infinite slope and slope in homogeneous soil. Level:6,7 9.identify hazard of hydraulic failure of the foundation pit bottom. Level:6 10.comment on geotechnical report. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Discussion Questions and answers Other 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.				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Group problem solving				
Methods of carrying out seminars	Students prepare seminars in teams (2 persons) and present them for the whole group.				
How construction exercises are held	Group problem solving Students solve individual assignments.				
Course content lectures	1.Role of Soil Mechanics. Three phases in soil., 2h, Learning outcomes:1,2 2.Pore water: permeability, capillary action, soil freezing, pore water pressure., 2h, Learning outcomes:2,8 3.Pore water: flow, bouyancy, seepage force., 2h, Learning outcomes:2,8 4.Stresses in soil. Hydraulic failure., 2h, Learning outcomes:2,8 5.Soil classification and indexes., 2h, Learning outcomes:1,2 6.Oedometer and settlement in soil., 2h, Learning outcomes:3 7.TEST. Case histories, 2h, Learning outcomes:1,2,3 8.Geotechnical investigation., 2h, Learning outcomes:1,2,3,4,5,10 9.Soil strength., 2h, Learning outcomes:5 10.Slope stability: infinite slope., 2h, Learning outcomes:5,6,7 11.TEST. Case histories, 2h, Learning outcomes:3,4,5,8 12.Slope stability., 2h, Learning outcomes:7,8,10 13.Landslides., 2h, Learning outcomes:7,8,10 14.Landslide stabilization methods., 2h, Learning outcomes:7,8,10 15.TEST. Case histories, 2h, Learning outcomes:6,7,8,10				
Course content laboratory	1.work in classroom 2.identification of coarse soils, 1h, Learning outcomes:1 3.identification of fine soils, 1h, Learning outcomes:1 4.work in classroom 5.work in classroom 6.work in classroom 7.work in classroom 8.work in classroom 9.work in classroom 10.work in classroom 11.slope stability, 1h, Learning outcomes:7 12.slope stability, 1h, Learning outcomes:7 13.work in classroom 14.work in classroom 15.work in classroom				
Course content seminars	1. 2.				

	3. 4. 5. 6. . 7. 8. 9. 10. 11. . 12. 13. 14. 15.Seminar presentation., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10								
Course content constructures	1.Soil density, specific and unit weight, water content., 2h, Learning outcomes:1,2 2.Pore water pressure, total and effective stresses., 2h, Learning outcomes:3 3.Classification and identification of coarse soils., 1h, Learning outcomes:1,2 4.Classification and identification of fine soils., 1h, Learning outcomes:1,2 5.Pore water pressure, total and effective stresses: seepage. Effects of soil permeability., 2h, Learning outcomes:3 6.Pore water pressure, total and effective stresses: seepage. Effects of soil permeability., 2h, Learning outcomes:3 7.Settlement and consolidation., 2h, Learning outcomes:4 8.Direct shear., 2h, Learning outcomes:4 9.Geotechnical laboratory., 2h, Learning outcomes:1,2,4,5,9 10.Infinity slope., 2h, Learning outcomes:6,7,8 11.Geoslope., 1h, Learning outcomes:6,7,8 12.Geoslope., 1h, Learning outcomes:6,7,8 13.Geoslope., 2h, Learning outcomes:6,7,8 14.Slope stability., 2h, Learning outcomes:6,7,8 15.seminar								
Required materials	Basic: classroom, blackboard, chalk... Special purpose laboratory General purpose computer laboratory Whiteboard with markers Overhead projector Portable overhead projector								
Exam literature	Basic literature: 1. Zlatovic, S., 2006, Uvod u mehaniku tla, TVZ, http://nastava.tvz.hr/zlatovic/knjiga/zlatovic_2006_uvod_u_mehaniku_tla_naslov.htm Additional literature: 1. Nonveiller,E: Mehanika tla. Temeljenje građevina. Školska knjiga, Zagreb. 1979, 1981 2. Nonveiller,E.: Klišenje i stabilizacije kosina, Školska knjiga, Zagreb, 1987, 204 str 3. Lambe,T.W., Whitman,R.V.: Soil Mechanics, John Wiley Sons, Inc. , New York, 1969,553 str 4. Bowles,J.E.: Foundation Engineering Handbook, Van Nostrand Reinhold Co., New York, 1982, 752 str. 5. Verruijt , A., Soil mechanics, Delft University of Technology, http://geo.verruijt.net/ , 2006 6. Eurocode 7: Geotechnical design								
Students obligations	All of the conditions to be fulfilled: two assignments solved - at least 9 points (target: 10 points), seminary - at least 3 points, at least 10 points for each of 3 tests (target: 20 points), in total at least 60 points of targeted 100 points.								
Knowledge evaluation during semester	2 assignments: target: 10 points (20 in total) 3 tests: target: 20 points (60 or more in total) 1 seminary: target 10 or more (10 or more in total) mini-tests, homeworks etc: target 2 or 3 points each (10 or more in total). Students who obtain 75 or more points are invited to oral exam directly.								
Knowledge evaluation after semester	Examinations: written part: problems, oral part: recognition of a problem, way to solution								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>1</td></tr> <tr> <td>(Activity in class)</td><td>3</td></tr> </table>	Aktivnost	ECTS	(Written exam)	1	(Oral exam)	1	(Activity in class)	3
Aktivnost	ECTS								
(Written exam)	1								
(Oral exam)	1								
(Activity in class)	3								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have completed Građevinski materijali Students cannot enroll in this course unless they have completed Osnove geologije Students cannot enroll in this course unless they have passed Matematika I Students cannot enroll in this course unless they have passed Tehnička mehanika								
ISVU equivalents:	22346;155940;								



Proposal made by	dr.sc. Sonja Zlatović
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Code WEB/ISVU	23923/184651	ECTS	5.0	Academic year	2018/2019
Name	Steel Structures				
Status	4th semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (12+0+0+18) 90
Teachers	Lectures:1. dr.sc. Krunoslav Pavković dipl.ing.grad. Lectures:2. prof.vis.šk. Boris Baljkas Auditory exercises:dr.sc. Krunoslav Pavković dipl.ing.grad. Auditory exercises: Šime Serdarević mag. ing. aedif. Construction exercises:dr.sc. Krunoslav Pavković dipl.ing.grad. Construction exercises: Šime Serdarević mag. ing. aedif.				
Course objectives	Students acquire basic knowledge on the shaping, design, analysis, safety and realization of steel structures.				
Learning outcomes:	1.present structural systems for steel structures. Level:6,7 2.analyze construction procedures. Level:6 3.estimate actions on steel structures. Level:6,7 4.calculate resistance of steel elements. Level:6 5.draw a disposition concept for steel structures. Level:6 6.draw a working design documentation for simpler steel structures. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Discussion Questions and answers Actual structures are presented in the stage of design, fabrication and erection by Student group size means of drawings, photographs and video presentations.				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming Computer simulations Presentation of structures through drawings, and explanations relating to preparation of structural design documents.				
How construction exercises are held	Discussion, brainstorming Interactive problem solving Workshop Independent elaboration of design documents for structures. Design work and working drawings.				
Course content lectures	1.-, 2h, Learning outcomes:1 2.-, 2h, Learning outcomes:1 3.-, 2h, Learning outcomes:1 4.-, 2h, Learning outcomes:2 5.-, 2h, Learning outcomes:5 6.-, 2h, Learning outcomes:5 7.-, 2h, Learning outcomes:3,4,5 8.-, 2h, Learning outcomes:3,4 9.-, 2h, Learning outcomes:4,6 10.-, 2h, Learning outcomes:6 11.-, 2h, Learning outcomes:3 12.-, 2h, Learning outcomes:1 13.-, 2h, Learning outcomes:6 14.-, 2h, Learning outcomes:6 15.-, 2h, Learning outcomes:6				
Course content auditory	1.-, 2h, Learning outcomes:1 2.-, 2h, Learning outcomes:5 3.-, 2h, Learning outcomes:5 4.-, 2h 5.-, 2h 6.-, 2h, Learning outcomes:2,3 7.-, 2h 8.-, 1h, Learning outcomes:3,4 -, 1h, Learning outcomes:4 9.-, 2h 10.-, 2h 11.-, 2h 12.-, 2h, Learning outcomes:3,4,6 13.-, 2h 14.-, 2h 15.-, 2h				
Course content constructs	1.-, 2h 2.-, 2h 3.-, 2h 4.-, 2h, Learning outcomes:1 5.-, 2h, Learning outcomes:1 6.-, 2h 7.-, 2h, Learning outcomes:3,4				

	8.-, 2h 9.-, 2h, Learning outcomes:3,4 10.-, 2h, Learning outcomes:3,4 11.-, 2h, Learning outcomes:3,4 12.-, 2h 13.-, 2h, Learning outcomes:6 14.-, 2h, Learning outcomes:6 15.-, 2h, Learning outcomes:6								
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment								
Exam literature	Basic literature: 1. B. Androić, D. Džeba, I. Dujmović: METALNE KONSTRUKCIJE I, Udžbenik sveučilišta u Zagrebu, Građevinski fakultet, Izdavač: IGH Zagreb 1994. Additional literature: 1. A. Vukov: UVOD U METALNE KONSTRUKCIJE , Izdavač: Fakultet građevinskih znanosti Sveučilišta u Splitu, 1988. 2. TEHNIČKA ENCIKLOPEDIJA: Čelik, Čelične konstrukcije, aluminijske konstrukcije, HLZ, Zagreb. 3. B. Androić, D. Džeba, I. Dujmović: METALNE KONSTRUKCIJE 4, Udžbenik sveučilišta u Zagrebu, Građevinski fakultet, Izdavač: IA PROJEKTIRANJE, Zagreb 2003. 4. Helmut C. Schultiz, Werner Sobek, Karl J. Habermann: STEEL CONSTRUCTION MANUAL, Izdavač: Birkhauser Verlag Detail edition, Basel, 1999. (engleski ili njemački jezik!) 5. L. V. Leech: STRUCTURAL STEELWORK FOR STUDENTS. Izdavač: Butterworth co., London 1988.								
Students obligations	maximum of 3 absences from exercises								
Knowledge evaluation during semester	Programski zadatak#1#0#75\$Usmena provjera znanja#1#0#25\$								
Knowledge evaluation after semester	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.								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> <tr> <td>(Project)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Oral exam)	2	(Project)	1	(Written exam)	2
Aktivnost	ECTS								
(Oral exam)	2								
(Project)	1								
(Written exam)	2								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot pass this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Građevinski materijali Students cannot enroll in this course unless they have passed Matematika I Students cannot enroll in this course unless they have passed Nacrtna geometrija u graditeljstvu I Students cannot enroll in this course unless they have completed Proračun konstrukcija								
ISVU equivalents:	22347;155942;								

Code WEB/ISVU	23456/155965	ECTS	3.0	Academic year	2018/2019
Name	Strength of materials				
Status	2nd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				15+30 (28+2+0+0) 45
Teachers	Lectures:1. dr.sc. Krunoslav Pavković dipl.ing.grad. Lectures:2. doc. dr. sc. Dean Čizmar dipl. ing. grad. Auditory exercises: Šime Serdarević mag. ing. aedif. Laboratory exercises: Šime Serdarević mag. ing. aedif.				
Course objectives	/				
Learning outcomes:	1.Determining the basic load cases and internal forces. Level:6 2.Calculate stresses of structure elements. Level:6 3.Solve main balance equations. Level:6 4. Calculate deformations of structural elements.. Level:6 5.Apply Hook law. Level:6 6. Calculate the geometric characteristics of the section. Level:6 7. Distinguish pure bending, bending forces and biaxial bending. Level:6 8.Analytical and grafoanalytical defining defamation of girders . Level:6 9. Calculate the core of cross-section. Level:6 10.Buckling check. Level:6				
Methods of carrying out lectures	Ex cathedra teaching				
Methods of carrying out auditory exercises	Group problem solving				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment				
Course content lectures	1.General assumptions. Basic assumptions in strength of materials. External and internal forces. Basic loading of beam, 1h, Learning outcomes:1 2.Stress analysis. Differential equations of balance and transformation equations. , 1h, Learning outcomes:1,2,3 3.Major stresses. Mohrs stress circle. Strain analysis. Major strains. , 2h, Learning outcomes:4 4.Hooke law. Material elasticity constants. Influence of temperature. , 1h, Learning outcomes:5 5.Geometric characteristic of flat beam cross sections, 1h, Learning outcomes:6 6.Moment of inertia. Main axes of inertia. Moment of resistance. Steiners theorem. , 1h, Learning outcomes:6 7.Axial beam loading. Temperature stress. Shear. , 1h, Learning outcomes:1,2,3,4,5,6 8.Torsion of flat and non flat beams., 1h, Learning outcomes:1,2,3,4,5,6 9.Pure bending of flat beams. , 1h, Learning outcomes:1,2,3,4,5,6,7 10.Bending under forces. Eccentric loading. , 1h, Learning outcomes:1,2,3,4,5,6,7 11.Deflections of beams in bending (analytical and graphical approach), 2h, Learning outcomes:1,3,8 12.Cross section core, 1h, Learning outcomes:6,9 13.Buckling of beams. Euler critical force., 1h, Learning outcomes:10 14./ 15./				
Course content auditory	1.General assumptions. Stress and strain analysis. Stress tensor. Differential equations of balance and transformation equations, 3h, Learning outcomes:1,2,3,4,5 2.Stress-strain relation. Hooke law. Material elasticity constant., 3h, Learning outcomes:1,2,3,4,5 3.Geometric characteristics of cross sections, 3h, Learning outcomes:6 4.Axial beam loading - extension and pressure , 2h, Learning outcomes:1,2,3,4,5 5.Errors in execution of beams and temperature streses, 2h, Learning outcomes:1,2,3,4,5 6.Shear of flat beam cross sections, 3h, Learning outcomes:1,2,3,4,5 7.Torsion of flat beam cross sections, 2h, Learning outcomes:1,2,4,5,6 8.Bending of flat beams. Pure bending, 2h, Learning outcomes:1,2,3,4,5,6 9.Bending under forces, 2h, Learning outcomes:1,2,3,4,5,6 10.Analytical method for calculation of beam deflections, 2h, Learning outcomes:1,3,8 11.Graphical method for calculation of beam deflections, 2h, Learning outcomes:1,3,8 12.Buckling of beams, 2h, Learning outcomes:10 13./ 14./ 15./				
Course content laboratory	1. Testing of beam and material diagram. Determination of constants of elasticity, 2h, Learning outcomes:1,2 2./ 3./ 4./ 5./ 6./ 7./ 8./ 9./ 10./ 11./ 12./ 13./ 14./				

	15./								
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment								
Exam literature	[1]V. Šimić: Otpornost materijala I, Školska knjiga, Zagreb, 1992. [2]V. Šimić: Otpornost materijala II, Školska knjiga, Zagreb, 1995.								
Students obligations	25% on colloquiums during semester								
Knowledge evaluation during semester	First colloquium: practical problem (max 30%) Second colloquium: practical problem (max 30%) Requirements: more than 50% on each colloquium								
Knowledge evaluation after semester	Written and oral exam								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>1</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Written exam)	1	(Oral exam)	1	(Constantly tested knowledge)	1
Aktivnost	ECTS								
(Written exam)	1								
(Oral exam)	1								
(Constantly tested knowledge)	1								
Remark	This course can not be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have completed Tehnička mehanika Students cannot pass this course unless they have passed Tehnička mehanika								
ISVU equivalents:	147427;								
Proposal made by	Dr. sc. Dean Čizmar dipl. ing. građ., 4.4.2017								

Code WEB/ISVU	23935/184732	ECTS	5.0	Academic year	2018/2019
Name	Transport and Environment				
Status	6th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (8+0+0+22) 90
Teachers	Lectures:1. dr.sc. Mladen Petrić dipl.ing.građ. Lectures: Ivana Bartolić , pred. Auditory exercises: Dejan Kovačević dipl.ing.građ. Construction exercises: Dejan Kovačević dipl.ing.građ.				
Course objectives	Students will learn to recognise environmental impacts of road construction and road traffic, and to plan and implement environmental mitigation measures aimed at eliminating or reducing such unfavourable impacts.				
Learning outcomes:	1.identify features of particular types of traffic and their pressure on the environment. Level:6 2.estimate pressures and impacts of certain types of traffic on the environment. Level:6,7 3.analyze the processes and data of sustainable planning and the use of roads. Level:6 4.establish general measures to mitigate the adverse impact of transport on the environment. Level:6,7 5.propose technical solutions of road runoff. Level:6,7 6.establish measures to protect the environment from the waste water from roads. Level:6 7.suggest a way of maintaining the drainage system of roads. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Homework presentation 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.				
Methods of carrying out auditory exercises	Group problem solving Other Solving tasks on the blackboard, with active student participation.				
How construction exercises are held	Group problem solving Discussion, brainstorming Workshop Other The work in groups to solve the programming tas				
Course content lectures	1.The state traffic and development trends , 1h, Learning outcomes:1 Main components of the environment, 1h, Learning outcomes:1 2.Types of traffic and environmental impacts, 2h, Learning outcomes:2 3.The pressures and impacts of transport on the environment, 2h, Learning outcomes:2 4.Planning and use of roads according to the principles of sustainability, 2h, Learning outcomes:3 5.Planning and use of roads according to the principles of sustainability, 1h, Learning outcomes:3 Measures to mitigate the adverse impact of transport on the environment, 1h, Learning outcomes:4 6.Measures to mitigate the adverse impact of transport on the environment, 2h, Learning outcomes:4 7.Drainage and elements of road runoff, 2h, Learning outcomes:5 8.I. preliminary exam., 2h, Learning outcomes:1,2,3,4 9.Drainage and elements of road runoff, 2h, Learning outcomes:5 10.Facilities for treatment of rainwater from roads, 2h, Learning outcomes:6 11.Facilities for treatment of rainwater from roads, 2h, Learning outcomes:6 12.Facilities for treatment of rainwater from roads, 2h, Learning outcomes:6 13.Maintenance and reconstruction of drainage systems during use, 2h, Learning outcomes:7 14. Maintenance and reconstruction of drainage systems during use, 2h, Learning outcomes:7 15.II. preliminary exam, 2h, Learning outcomes:5,6,7				
Course content auditory	1.An example of the determination of the relevant heavy rain for runoff from roads, 2h, Learning outcomes:4 2.Examples of calculation of the relevant hydrograph of runoff from roads., 2h, Learning outcomes:4 3.Design of oil and grease separator, 2h, Learning outcomes:6 4.Design of oil and grease separator, 2h, Learning outcomes:6 5.Designing lagoon with extended retention, 2h, Learning outcomes:6 6.Designing lagoon with extended retention, 2h, Learning outcomes:6 7.No lectures. 8.No lectures. 9.No lectures. 10.No lectures. 11.No lectures. 12.No lectures. 13.No lectures. 14.No lectures. 15.No lectures.				
Course content constructs	1.No lectures 2.No lectures 3.No lectures 4.No lectures 5.No lectures 6.No lectures 7.Interpretation and work on a seminar paper., 2h, Learning outcomes:6 8.No lectures 9.Interpretation and work on a seminar paper., 2h, Learning outcomes:6 10.Interpretation and work on a seminar paper., 2h, Learning outcomes:6 11.Interpretation and work on a seminar paper., 2h, Learning outcomes:6				

	12. Interpretation and work on a seminar paper., 2h, Learning outcomes:6 13. No lectures 14. No lectures 15. No lectures
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment
Exam literature	Nastavni materijali: Mladen Petrićec - Promet i okoliš I. dio Nastavni materijali: Davor Malus - Zaštita okoliša od negativnog djelovanja prometnica Zbornici s 1., 2., i 3. Kongresa o cestama
Students obligations	Attendance of lectures and exercises. It is necessary to achieve 30 or more points score through activities during the semester (preliminary exams, seminars,...).
Knowledge evaluation during semester	Through activities during the semester a student can achieve 30-60 points score. Student who achieve more than 15 and less than 30 points score is allowed to write additional test. If student achieve minimum of 30 points score or more, student is allowed to take final exam. Student who achieve less than 15 mark points during semester in the next year must enrol the subject again.
Knowledge evaluation after semester	Final exam, by which student can achieve 40 points score, is obligatory for all subjects. For a positive final exam evaluation it is required 20 points score (50%). The final subject mark contains points achieved during the semester and on final exam as a percentage of acquired knowledge and skills as follows: 90 - 100 - A 80 - 89.9 - B 65 - 79.9 - C 60 - 64.9 - D 50 - 59.9 - E
Student activities:	Aktivnost (Classes attendance) ECTS 5
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Zaštita okoliša Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Ceste I
ISVU equivalents:	147448;155967;
Proposal made by	dr.sc. Mladen Petrićec prof. v. šk.

Code WEB/ISVU	23438/155935	ECTS	4.0	Academic year	2018/2019
Name	Waste Management				
Status	5th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (12+0+18+0) 60
Teachers	Lectures:1. Tomislav Domanovac Lectures:mr.sc. Gorana Čosić-Flajsig viši predavač Auditory exercises: Tomislav Domanovac Seminar exercises: Tomislav Domanovac				
Course objectives	Students will be able to recognise and independently solve waste management problems.				
Learning outcomes:	1.make distinction between the terms waste and garbage. Level:6 2.categorize and classify types of waste. Level:6 3.design an integrated sustainable waste management system. Level:6 4.identify places and causes of generation of construction waste. Level:6 5.anticipate sustainable construction waste management projects. Level:6,7 6.comment on advantages and shortcomings of waste disposal. Level:6 7.present to experts and general public the significance and scope of waste management. Level:6,7 8.anticipate and design a construction waste sorting facility. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Other 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.				
Methods of carrying out auditory exercises	Group problem solving Other Solving concrete tasks, with active student participation.				
Methods of carrying out seminars	Other Work in groups on solving defined problems, based on solved tasks. Insisting on own solution proposals to problems by students.				
Course content lectures	1.Poimanje materijalnog i nematerijalnog otpada., 2h, Learning outcomes:1 2.Otpad nije sme vrste otpada., 2h, Learning outcomes:1,2 3.Katalog otpada, posebne vrste otpada., 2h, Learning outcomes:1,2,7 4.Otklanjanje-zbrinjavanje-gospodarenje., 2h, Learning outcomes:1,2,3,6 5.Izbjegavanje - smanjivanje otpada., 2h, Learning outcomes:1,2,4,6 6.I. kolokvij, 1h, Learning outcomes:1,2,4,6 Cjeloviti sustav odzivnog gospodarenja otpadom., 1h, Learning outcomes:3,5,6,7 7.Odvojeno skupljanje otpada, 2h, Learning outcomes:2,3 8.Reciklaa granskog otpada., 2h, Learning outcomes:3,5 9.Oporaba i obrada granskog otpada., 2h, Learning outcomes:3,5 10.Odlaganje otpada, vrste odlagalita., 2h, Learning outcomes:3,6 11.EU propis i odlaganje otpada., 2h, Learning outcomes:6,7 12.Opasan i problemati otpad., 2h, Learning outcomes:2,3,7 13.II. kolokvij, 1h, Learning outcomes:2,3,5,6,7 Gospodarenje graim otpadom., 1h, Learning outcomes:5,7 14.Mobilna postrojenja za RGO., 2h, Learning outcomes:4,5,7 15.Sortirnica graog otpada - projekt., 2h, Learning outcomes:8				
Course content auditory	1.EU i hrvatski aktualni propisi za grai otpad., 2h, Learning outcomes:2 2.EU i hrvatski aktualni propisi za grai otpad., 2h, Learning outcomes:2 3.Vrste graog otpada., 2h, Learning outcomes:2 4.Vrste graog otpada., 2h, Learning outcomes:2 5.Terenske vjebe., 2h, Learning outcomes:6 6.Terenske vjebe., 2h, Learning outcomes:6 7.Terenske vjebe., 2h, Learning outcomes:6 8.Nema vjebi. 9.Nema vjebi. 10.Nema vjebi. 11.Nema vjebi. 12.Nema vjebi. 13.Nema vjebi. 14.Nema vjebi. 15.Nema vjebi.				
Course content seminars	1.Nema vjebi. 2.Nema vjebi. 3.Nema vjebi. 4.Nema vjebi. 5.Nema vjebi. 6.Nema vjebi. 7.Nema vjebi. 8.Obrazloenje i na provedbe seminarskih vjebi., 2h 9.Mjesta nastanka graog otpada - izrada seminarskog., 2h, Learning outcomes:4 10.Mjesta nastanka graog otpada - izrada seminarskog., 2h, Learning outcomes:4 11.Mjesta nastanka graog otpada - izrada seminarskog., 2h, Learning outcomes:4 12.Konstrukcija i projekt postrojenja RGO., 2h, Learning outcomes:5,8				

	13.Konstrukcija i projekt postrojenja RGO., 2h, Learning outcomes:5,8 14.Konstrukcija i projekt postrojenja RGO., 2h, Learning outcomes:5,8 15.Prezentacija i obrana seminarskih radova., 2h, Learning outcomes:4,5,8
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment
Exam literature	Osnovna: 1. Zlatko Milanović i dr.: Odpad nije smeće, Gospodarstvo i okoliš / Mtg-topograf, Zagreb 2002. 2. Zlatko Milanović: Deponij, trajno odlaganje otpada, ZGO Zagreb 1992. 3. Vladimir Potočnik V.: Obrada komunalnog otpada svjetska iskustva MTG Consulting, Velika Gorica 1997. 4. Grupa autora: BIOEN, Energetski institut Hrvoje Požar, Zagreb 1998. Dodatna: 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.
Students obligations	Izraseminarski rad, uredno pohae nastave. Uspjeno položen Kolokvij s numerim i teoretskim odrednicama.
Knowledge evaluation during semester	Aktivan i konstruktivan rad na vježbama. Uspjeno izra i objanjenji seminarski radovi i položen Kolokvij. Prema sakupljenom broju bodova dobivaju se sljedeće ocjene: 61-80 bodova - dovoljan (2) 81-100 bodova - dobar (3) 101-110 bodova - vrlo dobar (4) vie od 111 bodova - izvrstan (5).
Knowledge evaluation after semester	Ispit se polae u dva dijela: pismeni i usmeni dio.
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Zaštita okoliša Students cannot enroll in this course unless they have passed Osnove hidrologije i hidraulike Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Hidrologija i hidraulika
ISVU equivalents:	22376;147435;
Proposal made by	v.predavač Zlatko Milanović, 31.3.2014.

Code WEB/ISVU	23933/184729	ECTS	5.0	Academic year	2018/2019
Name	Water protection				
Status	5th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (5+2+5+18) 90
Teachers	Lectures:1. mr.sc. Gorana Čosić-Flajsig viši predavač Auditory exercises: Marin Ganjto Auditory exercises: Dejan Kovačević dipl.ing.građ. Laboratory exercises: Dejan Kovačević dipl.ing.građ. Seminar exercises: Dejan Kovačević dipl.ing.građ. Construction exercises: Dejan Kovačević dipl.ing.građ.				
Course objectives	Students will be able to recognise water protection problems, and will learn to implement civil engineering measures aimed to reducing wastewater pollution into the water bodies.				
Learning outcomes:	1.analyse water protection as the part of integrated water management. Level:6 2.analyse of the point and diffuse pollution sources . Level:6 3.calculate pollution load for an urban community. Level:6 4.assesment of the water body state. Level:6,7 5.analyse water state of the catchment area and propose necessary water protection measures. Level:6 6.calculate of the small settlement sewage system. Level:6 7.propose a waste water treatment concept using the 1st, 2nd, and 3rd level of purification. Level:6,7 8.propose a sludge treatment and disposal concept. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Discussion Questions and answers Seminar, students presentation and discussion 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.				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Discussion, brainstorming Mind mapping Interactive problem solving Solving practical tasks on the blackboard, with active student participation.				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming				
Methods of carrying out seminars	Laboratory exercises on laboratory equipment Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming Mind mapping Workshop				
How construction exercises are held	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Interactive problem solving Workshop Other Preparation of a program in groups, under lecturer				
Course content lectures	1.Plan of the course content and exams, 2h The issue of water protection within the integrated water management, 1h, Learning outcomes:1 Plannning of water protection within the integrated water management, 1h, Learning outcomes:1 2.Legislative and other measures to protect water , 1h, Learning outcomes:1 Sources and types of pollution, 2h, Learning outcomes:2 3.Basic ecological characteristics of water and description of water status, 2h, Learning outcomes:4 The impact of pollution on water status, 1h, Learning outcomes:4 4.Basic procedures and measures used in the reduction of point and diffuse sorces of pollution , 4h, Learning outcomes:5,8 5.Sewage system, 3h, Learning outcomes:5 6.Hydraulic design of sewage system, 2h, Learning outcomes:5 7.Sizeing sewage system, 1h, Learning outcomes:6 Basic principles of wastewater treatment, 1h, Learning outcomes:7 8.No lessonns 9.No lessons 10.Municipal wastewater treatment , 4h, Learning outcomes:7,8 11.Municipal wastewater treatment , 4h, Learning outcomes:7,8 12.No lessons 13.No lessons 14.Second Colloquium, 1h, Learning outcomes:6,7,8				

	15.No lessons
Course content auditory	1.No lessons 2.Calculation of pollution load and Assessment of water status, 1h, Learning outcomes:3 3.No lessons 4.No lessons 5.Sewer system , 1h, Learning outcomes:5 6.Hydraulic design of sewage system, 1h, Learning outcomes:6 7.Sizeing sewage system, 1h, Learning outcomes:6 8.No lessons 9.No lessons 10.No lessons 11.No lessons 12.Municipal wastewater treatment, 1h, Learning outcomes:6,7 13.No lessons 14.No lessons 15.No lessons
Course content laboratory	1.No lessons 2.No lessons 3.No lessons 4.No lessons 5.No lessons 6.No lessons 7.No lessons 8.No lessons 9.No lessons 10.No lessons 11.No lessons 12.Visiting wastewater treatment plant, 2h, Learning outcomes:1,2,3,4,5,6,7,8 13.No lessons 14.No lessons 15.No lessons
Course content seminars	1.No lessons 2.No lessons 3.No lessons 4.No lessons 5.No lessons 6.No lessons 7.No lessons 8.No lessons 9.No lessons 10.No lessons 11.No lessons 12.No lessons 13.Municipal wastewater treatment, 3h, Learning outcomes:7,8 14.Municipal wastewater treatment, 2h, Learning outcomes:7,8 15.No lessons
Course content constructures	1.No lessons 2.No lessons 3.No lessons 4.Calculation of pollution load, 2h, Learning outcomes:3 5.The first project -submission and interpretation, 1h, Learning outcomes:1,2,3,4 6.Hydraulic design of sewage system, 1h, Learning outcomes:6 The first Colloquium, 1h, Learning outcomes:1,3,4,5 7.Sizeing sewage system, 2h, Learning outcomes:5 8.Sizeing sewage system, 2h, Learning outcomes:5 9.Sizeing sewage system, 1h, Learning outcomes:5 10.Sizeing sewage system, 2h, Learning outcomes:5 11.Sizeing sewage system, 2h, Learning outcomes:5 12.The second project - submission and interpretation, 2h, Learning outcomes:5,6 13.No lessons 14.No lessons 15.The third project -submission and interpretation, 2h, Learning outcomes:7,8
Required materials	Special purpose laboratory Special purpose computer laboratory Whiteboard with markers Overhead projector Video equipment Preparation of a program individually or in groups, under lecturer supervision
Exam literature	Basic literature: 1. Ćosić-Flajsig G.: Skripta kolegija Zaštita voda, TVZ, Graditeljski odjel 2. Tedeschi S.: Zaštita vodnih sustava i pročišćavanje otpadnih voda, HDGI, Zagreb, 1997. 3. Margeta J., Oborinske i otpadne vode: teret onečišćenja, mjere zaštite, Građevinsko-arhitektonski fakultet Sveučilišta u Splitu, Split, 2007.

	4. Tušar B., Pročišćavanje otpadnih voda, KIGEN, GFV, Zagreb, 2009. Godine 5. Margeta J.: Osnove gospodarenja vodama, Građevinski fakultet Split, 1992 Additional literature: 1. Margeta J.: Guidelines on Sewage Treatment and Disposal for the Mediterranean Region, WHO-GEF, Athens, 2004. - Metcalf Eddy; Wastewater Engineering, Treatment Disposal, Reuse, McGraw-Hill International Editions, 2007.	
Students obligations	During the semester, 2 colloquium are planned and at least every 7 points need to be collected at each colloquium. During the semester, the preparation of 3 project, 6 points must be collected on each project.	
Knowledge evaluation during semester	During the semester, 2 colloquies are planned (a combination of theoretical and practical questions presented in lectures and exercises) through which students are receiving points. Total can be collected $1 \times 18 + 1 \times 18 = 36$ points. (minimum 9 points per colloquium for passed colloquium). Students can write only one correctional colloquium (I or II colloquium) in the oral part of the exam. Every student during the semester should, with the help of the teacher, create, submit and defend the given term of III (three) programs: I program: quantification of pollution sources, Reduction of pollution sources through wastewater treatment plants maximum 4 points / minimum 1 point for signature II program: Waste water drainage maximum 12 points / minimum 3 points for signature III program: Purification of municipal wastewater maximum 8 points / minimum 2 points for signature Total: maximum 24 points / minimum 6 points for signature The student can not get the assignment for the next program if he did not submit the previous program in time.	
Knowledge evaluation after semester	At the end of the semester it is mandatory to check the student,s knowledge of the exam, which makes 40 points of assessment. The exam is usually composed of a written and oral part of the exam. An essential requirement for exam is the achievement of 50 % and more success on the written part. The find grade of the subject is the sum of marks obtained during the semester and the exam as a percentage of accepted knowledge and skills, namely: 90-100 - excellent (5) 80-89,9 - very good (4) 65 - 79,9 - good (3) 50 - 64,9 sufficient (2)	
Student activities:	Aktivnost (Written exam) (Oral exam) (Constantly tested knowledge) (Practical work)	ECTS 1 1 2 1
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have passed Zaštita okoliša Students cannot enroll in this course unless they have passed Osnove hidrologije i hidraulike Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Hidrologija i hidraulika	
ISVU equivalents:	22379;155977;	
Proposal made by	Gorana Čosić-Flajsig, M.sc., Senior Lecturer, 29.06.2018.	

Code WEB/ISVU	23355/147436	ECTS	4.0	Academic year	2018/2019
Name	Water Quality				
Status	5th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+15 (0+15+0+0) 75
Teachers	Lectures:1. dr.sc. Ivan Vučković dipl.ing.biologije Lectures:mr.sc. Gorana Čosić-Flajsig viši predavač Laboratory exercises:dr.sc. Ivan Vučković dipl.ing.biologije				
Course objectives	Students will be taught to recognise the significance and role of chemical and microbiological parameters in the preparation and treatment of various types of water.				
Learning outcomes:	1.asses the surface water status based on the regulatory regulation of monitoring. Level:6,7 2.adopt basic concepts from ecology of land water. Level:7 3.anticipate effects of human activities on the condition of water and water ecosystems. Level:6,7 4.asses the health of drinking water, agriculture, swimming (fish), swimming (swimming pool and beach. Level:6,7 5.apply water protection measures to maintain good surface water status. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Questions and answers 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.				
Methods of carrying out laboratory exercises	Group problem solving Workshop At the laboratory, the students will gain insight into the entire process of water quality testing, with focus on chemical and microbiological parameters.				
Course content lectures	1.The plan of course content and exam, 2h 2.Concept,content and importance the ecology of surface water , 1h, Learning outcomes:1,2 3.Connection of the hydrology and ecology, 1h, Learning outcomes:1,2 3.Circulation of matter and energy flow, 1h, Learning outcomes:1,2 Biogeochemical processes and organic production, 1h, Learning outcomes:1,2 4.Condition of water and importance of water conservation, 1h, Learning outcomes:1,2 The terms that describe of the water status, 1h, Learning outcomes:1,2 5.Evaluation of water status by biological and chemical parametars, 2h, Learning outcomes:2 6.Impact of pollution on water status, 1h, Learning outcomes:3 Hydromorfology, 1h, Learning outcomes:3 7.Methods and indicies descibing the ecological stzatus of water, 1h, Learning outcomes:4 River basin management and definition of watew body, 1h, Learning outcomes:4,5 8.Assessment of water status, 2h, Learning outcomes:4,5 9.Monitoring of surface and ground water, 2h, Learning outcomes:4,5 10.assessment of surface water status, 2h, Learning outcomes:4,5 11.Sustainable water use, 2h, Learning outcomes:4,5 12.Natural processes of waste water treatment , 2h, Learning outcomes:4 13.Applying Water Quality Course in practictis, 2h, Learning outcomes:4,5 14.Second Colloquium, 1h, Learning outcomes:1,2,4,5 Seminar paper - submission and explanation, 1h, Learning outcomes:1,2,3,5 15.Repeated colloquium, 1h, Learning outcomes:1,2,3,4,5 Oral part of the exam, 1h, Learning outcomes:1,2,3,4,5				
Course content laboratory	1.Analyses of chemical indicators in the water, 1h, Learning outcomes:1,2 Analyses of phisico-chemical indicators in the water, 1h, Learning outcomes:1 2.Analyses of microbiological indicators in the water, 1h, Learning outcomes:2 3.Analyses of biological indicators in the water, 2h, Learning outcomes:3 4.Analytical mthods for drinking water samples (sampling, analysis and opinion), 1h, Learning outcomes:2,3 5.The first colloquim, 1h, Learning outcomes:1,2,3 6.Hydromorphology, 2h, Learning outcomes:3 7.Field trip, 2h, Learning outcomes:1,2,3,4 8.Field trip, 2h, Learning outcomes:1,2,3,4,5 9.Field trip, 2h, Learning outcomes:1,2,3,4,5 10.No lecture. 11.No lecture. 12.No lecture. 13.No lecture. 14.No lecture. 15.No lecture.				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment				
Exam literature	Osnovna: 1. Separati koje priprema predmetni nastavnik, 2. Valić i sur. Zdravstvena ekologija, Medicinska naklada, Zagreb 2001. Dodatna: 1. S. Tedesci: Zaštita vodnih sustava i pročišćavanje otpadnih voda, Građevinski institut, Zagreb 1996. 2. Dennis R. Hill: Basic Microbiology for Drinking water Personnel				

Students obligations	Seminar work was done, regular attendance. Successfully laid I. and II. knowledge testing (Columns I and II) Attendance to field teaching Attend a tour of the la	
Knowledge evaluation during semester	Theoretical part of all learning outcomes, max. 70 points. Proportionality more than 36 points (50%) There is a repair colloquium Oral exam part max. 30 exams. Total max.100 points 91-100 = 5 81-90 = 4 3 = 71-80 2 = 61-70 60 and less = 1	
Knowledge evaluation after semester	The written part of the exam is mx.70 points. The oral exam is max.30 points. Passage: More than 42 points (60%) Total, max.100 points. 91-100 = 5 81-90 = 4 3 = 71-80 2 = 61-70 60 and less = 1	
Student activities:	Aktivnost (Constantly tested knowledge) (Experimental work) (Practical work)	ECTS 2 1 1
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have completed Hidrologija i hidraulika Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Zaštita okoliša Students cannot enroll in this course unless they have passed Osnove hidrologije i hidraulike	
ISVU equivalents:	22380;	
Proposal made by	lecture, Ivan Vučković, 20.4.2018.	

Code WEB/ISVU	23450/155955	ECTS	4.0	Academic year	2018/2019
Name	Water Supply and Sewerage I				
Status	5th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+0+20) 60
Teachers	Lectures:1. Stjepan Kordek dipl.ing.građ. Lectures:mr.sc. Gorana Čosić-Flajsig viši predavač Auditory exercises: Dejan Kovačević dipl.ing.građ. Construction exercises: Dejan Kovačević dipl.ing.građ.				
Course objectives	Students will be able to understand and solve problems relating to hydraulic structures that are used for water supply, drainage, and purification of waste water.				
Learning outcomes:	1.specify basic problems related to the supply of water to consumers. Level:6 2.compare differences between public and local water supply systems. Level:6,7 3.propose practical expertise for the construction and maintenance of water supply systems. Level:6,7 4.analyze pipes for pipelines, and pipe fittings types, differences, and problems in practical use. Level:6 5.draw 1:25 scale valve chamber assembly plan. Level:6 6.calculate quantity of water needed for the supply of water to town districts and towns. Level:6 7.specify all supply-system elements that need to be planned and realized to ensure proper water supply. Level:6,7				
Methods of carrying out lectures	Other Oral presentations, with use of modern educational tools. Graphic presentations and photographs of structures, from design phase to construction and exploitation.				
Methods of carrying out auditory exercises	Other Presentation of calculations and drawings of structures and design elements for structures.				
How construction exercises are held	Other Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities.				
Course content lectures	1.Water supply: Introduction, significance of water and water supply, characteristics of water, investigation works, 2h, Learning outcomes:1 2.Users and quantities used, water supply systems , 2h, Learning outcomes:2,3 3.Users and quantities used, water supply systems , 2h, Learning outcomes:2,3 4.Water sources, intake structures, calculations and design , 2h, Learning outcomes:2,3 5.Water sources, intake structures, calculations and design , 2h, Learning outcomes:2,3 6.Water sources, intake structures, calculations and design , 2h, Learning outcomes:2,3 7.Pipelines, water supply networks, pipe types, sizing and projects , 2h, Learning outcomes:2,3 8.I. preliminary exam., 2h, Learning outcomes:1,2,3 9.Pipelines, water supply networks, pipe types, sizing and projects , 2h, Learning outcomes:4,5 10.Pipelines, water supply networks, pipe types, sizing and projects , 2h, Learning outcomes:4,5 11.Facilities on a water supply system (water storage tanks, pumping stations), sizing of facilities and pumps, 2h, Learning outcomes:5,6 12.Facilities on a water supply system (water storage tanks, pumping stations), sizing of facilities and pumps, 2h, Learning outcomes:5,6 13.Facilities on a water supply system (water storage tanks, pumping stations), sizing of facilities and pumps, 2h, Learning outcomes:6,7 14.Facilities on pipeline route , 2h, Learning outcomes:7 15.II. preliminary exam, 2h, Learning outcomes:4,5,6,7				
Course content auditory	1.Calculations of water consumption, intake structures, 2h 2.Design of water storage tanks and pumping stations, 2h 3.Design of water storage tanks and pumping stations , 2h 4.Installation plans and pipe dimensions , 2h 5.Installation plans and pipe dimensions , 2h 6.No lectures, 2h 7.No lectures , 2h 8.No lectures , 2h 9.No lectures, 2h 10.No lectures, 2h 11.No lectures, 2h 12.Calculations of wastewater quantities, longitudinal grades, sizing of facilities along the network , 2h 13.No lectures , 2h 14.No lectures, 2h 15.No lectures, 2h				
Course content constructs	1.No lectures, 2h 2.No lectures, 2h 3.No lectures, 2h 4.No lectures, 2h 5.No lectures, 2h 6.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h 7.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h 8.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h 9.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h				

	10.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h 11.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h 12.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h 13.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h 14.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h 15.Independent project development: water supply system of a settlement, with facilities; sewerage system of a settlement, with facilities., 2h						
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment Oral presentations, with use of modern educational tools. Graphic presentations and photographs of structures, from design phase to construction and exploitation						
Exam literature	Basic literature: 1. Separati predmetnog nastavnika. 2. Mutschmann i Stimmelmayer: Priručnik opskrbe vodom, Građevinska knjiga, 1988. Beograd 3. Gulić: Opskrba vodom, DGH Zagreb Dodatna: 1. Abramov: Snabdjevanje vodom, Građevinska knjiga, Beograd; 2. Schulze: Wasserversorgung; 3. Purschel: Kommunale Wasserversorgung; 4. Fair Geyer: Elements of water supply and Waste Water Disposal John Wiley; 5. Steel, McGhee: Water supply and Sewerage International student Edition McGraw-Hill;						
Students obligations	Redovito pohađanje nastave i najmanje 25% bodova iz kolokvija.						
Knowledge evaluation during semester	Redovito pohađanje nastave i najmanje 60% bodova iz kolokvija. Pozitivno riješen programski zadatak.						
Knowledge evaluation after semester	Ispit se sastoji iz pismenog i usmenog dijela. Uvjet za usmeni dio je ostvarenje minimalno 60% uspjeha na pismenom dijelu.						
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Written exam)	2	(Oral exam)	2
Aktivnost	ECTS						
(Written exam)	2						
(Oral exam)	2						
Remark	This course can be used for final thesis theme						
Prerequisites:	Students cannot enroll in this course unless they have completed Vodogradnje Students cannot enroll in this course unless they have passed Osnove hidrologije i hidraulike Students cannot enroll in this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have completed Hidrologija i hidraulika Students cannot pass this course unless they have passed Vodogradnje Students cannot pass this course unless they have passed Hidrologija i hidraulika						
ISVU equivalents:	22374;						
Proposal made by	predavač Stjepan Kordek, dipl.inž.građ., 14.04.2014.						

Code WEB/ISVU	23451/155957	ECTS	5.0	Academic year	2018/2019
Name	Water Supply and Sewerage II				
Status	6th semester - Civil Engineering (Water and traffic infrastructure) (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (10+0+0+20) 90
Teachers	Lectures:1. mr.sc. Gorana Čosić-Flajsig viši predavač Auditory exercises:mr.sc. Gorana Čosić-Flajsig viši predavač Auditory exercises: Marin Ganjto Auditory exercises: Dejan Kovačević dipl.ing.građ. Construction exercises: Dejan Kovačević dipl.ing.građ.				
Course objectives	To enable a student to understand and solve problems related to sewage and wastewater treatment				
Learning outcomes:	1.calculate the relevant quantities of wastewater settlements. Level:6 2.to make a situational plan for a sewerage system of a smaller settlement. Level:6 3.calculate and dimension the sewage system. Level:6 4.calculate combain sewer overflow. Level:6 5.assess the required level of wastewater treatment and sludge treatment. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Questions and answers				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Computer simulations Workshop				
How construction exercises are held	Group problem solving Traditional literature analysis Computer simulations Workshop				
Course content lectures	1.INTRODUCTION-TEACHING ORGANIZATION, SOURCES AND TYPES OF POLLUTION, TYPES OF WASTE WATER, 2h, Learning outcomes:1 2.WASTE WATER SYSTEM IN URBAN AREA, UWWTD REVIEW, HISTORY OF SEWAGE, 2h, Learning outcomes:1 3.ELEMENTS OF THE SEWAGE SYSTEM, TYPES AND SELECTION OF THE SEWAGE SYSTEM, 2h, Learning outcomes:2 4.BASIC SCHEMES OF SEWAGE, DETERMINATION OF WASTE WATER VOLUMES, 2h, Learning outcomes:2 5.RACIONAL METHOD, HYDRAULIC CALCULATION OF SEWAGE NETWORK, 2h, Learning outcomes:1,2 6.HYDRAULIC CALCULATION OF SEWAGE NETWORK, LIMITATION: LONGITUDINAL SLOPES, MINIMUM PROFILES, WATER DEPTH IN CHANNELS, EXCAVATION LEVEL, VERTICAL GUIDANCE OF LINE, 2h, Learning outcomes:1,2 7.VERTICAL GUIDANCE OF LINE, DEFINITION OF INVERT LEVEL, CHANGE OF CHANNEL LEVELS, CHANNEL LAYOUTS, CHANGE OF DIRECTION, 2h, Learning outcomes:2,3 8.CHANNEL POSITION IN ROAD AND HOUSING CONNECTORS, STATIC CALCULATIONS OF COLLECTOR, SEWAGE COLLECTORS, TYPE OF CHANNELS, SHAPES AND CHARACTERISTICS, 2h, Learning outcomes:2,3 9.CONSTRUCTION OF BEDS FOR PIPES AND INCORPORATION FOR PIPE, WATERPROOF TESTING FOR CHANNELS, 2h, Learning outcomes:2,3 10.STRUCTURES IN SEWAGE SYSTEM, PROTECTION STRUCTURES, VENTILATION OF SEWAGE SYSTEM, 1h, Learning outcomes:4 11.COLLOQUIUM, 1h, Learning outcomes:1,2,3 12.SEWAGE PUMPING STATION, 2h, Learning outcomes:4 13.COMBAIN SEWER OVERFLOW STRUCTURES, 2h, Learning outcomes:4 14.WASTE WATER TREATMENT, 2h, Learning outcomes:5 15.WASTE WATER TREATMENT, 2h, Learning outcomes:5 16.II COLLOQUIUM, 1h, Learning outcomes:1,2,3,4,5 ORAL EXAM, 1h, Learning outcomes:3,4,5				
Course content auditory	1.PROGRAM ASSIGN, SEWAGE NETWORK SETTING AND CATCHMENT AREAS, 2h, Learning outcomes:1,2 2.NO TEACHING, 2h 3.NO TEACHING, 2h 4.HYDRAULIC CALCULATION OF SEWAGE NETWORK AND LONGITUDINAL PROFILES, 2h, Learning outcomes:3 5.NO TEACHING, 2h 6.NO TEACHING, 2h 7.NO TEACHING, 2h 8.NO TEACHING, 2h 9.NO TEACHING, 2h 10.NO TEACHING, 2h 11.PUMPING STATION, 2h, Learning outcomes:4 12.NO TEACHING, 2h 13.COMBINED SEWER OVERFLOW, 2h, Learning outcomes:4 14.NO TEACHING, 2h 15.CONSTRUCTION SITE VISITING, 2h, Learning outcomes:5				
Course content constructures	1.NO TEACHING, 2h 2.SEWAGE NETWORK SETTING AND CATCHMENT AREAS, 2h, Learning outcomes:1,2 3.SEWAGE NETWORK SETTING AND CATCHMENT AREAS, 2h, Learning outcomes:1,2 4.NO TEACHING, 2h 5.HYDRAULIC CALCULATION OF SEWAGE NETWORK AND LONGITUDINAL PROFILES, 2h, Learning outcomes:3 6.HYDRAULIC CALCULATION OF SEWAGE NETWORK AND LONGITUDINAL PROFILES, 2h, Learning outcomes:3				

	7.HYDRAULIC CALCULATION OF SEWAGE NETWORK AND LONGITUDINAL PROFILES, 2h, Learning outcomes:3 8.HYDRAULIC CALCULATION OF SEWAGE NETWORK AND LONGITUDINAL PROFILES, 2h, Learning outcomes:3 9.HYDRAULIC CALCULATION OF SEWAGE NETWORK AND LONGITUDINAL PROFILES, 2h, Learning outcomes:3 10.HYDRAULIC CALCULATION OF SEWAGE NETWORK AND LONGITUDINAL PROFILES, 2h, Learning outcomes:3 11.NO TEACHING, 2h 12.PUMPING STATION, 2h, Learning outcomes:4 13.NO TEACHING, 2h 14.COMBINED SEWER OVERFLOW, 1h, Learning outcomes:4 PROGRAM SUBMIT, 1h, Learning outcomes:3,4,5 15.NO TEACHING, 2h								
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector								
Exam literature	1.Čosić-Flajsig, G.: Interna skripta kolegija Opskrba vodom i odvodnja II, Ak.god. 2015/2016 2.Margeta, J.(1998): Kanalizacija naselja, GF Split, GF Osijek, IGH,PC Split								
Students obligations	A minimum of 23 points should be collected to get a signature: - Minimum 8 points on each colloquium (16 out of 46 points) - Minimum 7 points from the program (7 out of 14 points) At the time all the programs were submitted to the published terms.								
Knowledge evaluation during semester	Collocation is mandatory. During the semester, 2 colloquies are envisaged (a combination of theoretical and practical knowledge presented in the lectures) through which students receive points. Total can be collected 2 x 23 points = 46 points. To pass the exam, students must have a minimum of 12 credits per exam, and as a precondition for signing 8 points per colloquium. Students may attend one additional correctional exam (grade I colloquium or II colloquium) if they have not earned sufficient score or have been legitimately prevented.								
Knowledge evaluation after semester	In the 16th week of the academic year, a final oral exam will be taken that can result in a grade in the course of a course if the student is on a continuous basis during the semester and the knowledge student has demonstrated. With the points the student has accumulated during the semester, the student can get 40 points at the final examination by verbal exam. Students who collected 60 points and more passed the exam with the following success: - 60 and more points - sufficient (2) - 67 and more points - good (3) - 75 and more points - very good (4) - 85 and more points - excellent (5)								
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Written exam)</td><td>2</td></tr> <tr> <td>(Project)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>2</td></tr> </table>	Aktivnost	ECTS	(Written exam)	2	(Project)	1	(Oral exam)	2
Aktivnost	ECTS								
(Written exam)	2								
(Project)	1								
(Oral exam)	2								
Remark	This course can be used for final thesis theme								
Prerequisites:	Students cannot enroll in this course unless they have completed Opskrba vodom i odvodnja I Students cannot pass this course unless they have passed Opskrba vodom i odvodnja I								
ISVU equivalents:	39174;147444;								
Proposal made by	Gorana Čosić Flajsig, MSc, Senior lecturer								

Code WEB/ISVU	23931/184725	ECTS	5.0	Academic year	2018/2019
Name	Water Use				
Status	5th semester - Civil and Environmental Engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (8+0+0+22) 90
Teachers	Lectures:1. mr.sc. Gorana Čosić-Flajsig viši predavač Lectures:2. dr.sc. Mladen Petrićec dipl.ing.građ. Auditory exercises: Dejan Kovačević dipl.ing.građ. Auditory exercises:dr.sc. Mladen Petrićec dipl.ing.građ. Construction exercises: Dejan Kovačević dipl.ing.građ.				
Course objectives	Acquirement of the basic theoretical and practical knowledge about the water use for human consumption, food production, hydropower energy production and other purposes of the water use.				
Learning outcomes:	1.analyse and estimate necessary quantity and quality of the various water uses. Level:6 2.design of the water supply system reservoir. Level:6 3.design of the water supply sytem for the small settlement. Level:6 4.identification of the parameters for the hydropower plant concept). Level:6 5.calculate of the possible electric energy production. Level:6 6.propose of the solution for irrigation small agriculture area. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Discussion Questions and answers Seminar, students presentation and discussion Other Teoretical lectures aided by technical equipment and ocassional visit to laboratory, characteristic field locations and building site. Printoffs of the lectures are available by web site. Lectures are interactive, and the part of the lectures is analyse of the examples and discussion to prepare students for the future practical work.				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Workshop Other Problem-solving on the blackboard, with active student participation.				
How construction exercises are held	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming Preparation of a program individually and in the groups, with the help of teacher.				
Course content lectures	1.The plan of course content and exam, 2h Types of water use, 2h, Learning outcomes:1 2.The importance of water and water properties, 1h, Learning outcomes:1,2,3 Water sites, water production facilities and water conditioning, 1h, Learning outcomes:1,2,3 Water supply systems, 1h, Learning outcomes:2,3 Water use and water consumption , 1h, Learning outcomes:2,3 3.Calculation of water supply system reservoir , 2h, Learning outcomes:2,3 4.Hydraulic design of water supply system, 2h, Learning outcomes:2,3 5.Fieldwork, 2h, Learning outcomes:1,2,3,5,6 6.Sizeing of water supply system, 2h, Learning outcomes:3 7.Types and basic characteristics, pressure tests, 1h, Learning outcomes:3,4 Pumping stations, types and characteristics, 1h, Learning outcomes:3,4 8.No lessons 9.No lessons 10.Irrigation requirements and needs, 1h, Learning outcomes:6 Soil ad water - requirements of growing vegetable crops, 1h, Learning outcomes:6 Types and methodes of irrigation, 1h, Learning outcomes:6 Norma and hydromodule irrigation, Irrigation facilities, 1h, Learning outcomes:6 11.The impact of irrigation on the environment, 1h, Learning outcomes:6 12.The role of hydropower in the economy and energy needs, 2h, Learning outcomes:4 13.Hydropower calculation and analysis of water flows,, 2h, Learning outcomes:5 14.Accumulation management, 2h, Learning outcomes:5 15.Second colloquium, 1h, Learning outcomes:4,5,6				
Course content auditory	1.No lessons 2.No lessons 3.Preparation of the situational plan i hydraulic calculation of the water supply system, 1h, Learning outcomes:1,2,3 Calculation of reservoir water supply system, 1h, Learning outcomes:2,3 4.No lessons 5.No lessons 6.No lessons 7.Longitudinal profile of main pipeline, 1h, Learning outcomes:2,3 8.No lessons 9.Sludge outlet manhole. air valve manhole and section valve manhole, 1h, Learning outcomes:2,3 10.No lessons 11.First colloquium, 1h, Learning outcomes:1,2,3				

	12.Calculation for irrigation of agricultural land, 1h, Learning outcomes:6 13.Budget of electricity production, 2h, Learning outcomes:4,5 14.No lessons 15.No lessons
Course content constructs	1.No lessons 2.No lessons 3.No lessons 4.Hydraulic calculation of the water supply system, 2h, Learning outcomes:2,3 5.Fieldwork, 2h 6.Calculation of the water supply system reservoir, 2h, Learning outcomes:2,3 7.Longitudinal profile of main pipeline, 1h, Learning outcomes:2,3 8.Longitudinal profile of main pipeline, 4h, Learning outcomes:1,2,3 9.Sludge outlet manhole. air valve manhole and section valve manhole, 3h, Learning outcomes:2,3 10.No lessons 11.First project - surrender and defense, 2h, Learning outcomes:1,2,3 First Colloquium, 1h, Learning outcomes:1,2,3 12.Irrigation calculation of the agricultural area, 1h, Learning outcomes:6 13.No lessons 14.Budget of electricity production, 2h, Learning outcomes:4,5 15.Second project - surrender and defense, 1h, Learning outcomes:6 Third project - surrender and defense, 1h, Learning outcomes:4,5
Required materials	General purpose computer laboratory Whiteboard with markers Overhead projector Preparation of the calculation related to prepared auditoral exams. Preparation of a program in groups under lecturer supervision.
Exam literature	Osnovna: 1. Čosić-Flajsig Gorana, Petrićec Mladen: Interna skripta kolegija Korištenje voda, TVZ, Graditeljski odjel 2. Gulić, Ivan: Opskrba vodom, HSGI, Zagreb 2000. 3. Margeta, Jure: Vodoopskrba naselja, Planiranje, projektiranje, upravljanje i obrada vode, Sveučilište u Splitu, Građevinsko arhitektonski fakultet, Split, 2010 2. Gereš, Dragutin: Navodnjavanje. Građevni godišnjak96., HGDI, Zagreb, 1996., str. 315-390. Dodatna: 1. Kos, Zorko: Hidrotehničke melioracije- navodnjavanje, Školska knjiga, Zagreb, 1987. 2. Priručnik za hidrotehničke melioracije, I kolo; II kolo i III kolo - odabrana poglavlja; Hrvatsko društvo za odvodnju i navodnjavanje. Grupa autora, Zagreb,1985. 2003. 3. Vuković, Živko: Osnove hidrotehnike I/1 I/2, Akvamarine, Zagreb, 1996. 4. Stojić, Petar: Hidroenergetika, FGZ Split, 1995.
Students obligations	During the semester, 2 colloquium are planned and at least every 7 points need to be collected at each colloquium. During the semester, the preparation of 3 projects is planned and 6 points must be collected.
Knowledge evaluation during semester	During the semester, 2 colloquies are planned (the combination of theoretical and practical questions presented in lectures and exercises) through which students are receiving points. Total can be collected 1x18 + 1x18 =36 points (minimum 9 points for passes colloquium). I project: Water supply system maximum 13/minimum 3 points for signature II project: Irrigation system maximum 3/minimum 1 point for signature III project: Hydropower use maximum 8/minimum 2 points for signature Total: maximum 24 points/minimum 6 points for signature The student can not get the assignment for the next project, if he did not submit the previous project on time.
Knowledge evaluation after semester	At the end of the semester, it is mandatory to check the students,s knowledge on the exam, which makes 40 points of assessment. The exam is usually composed of the written and oral part of the exam. An essential requirement for oral exam is the achievement of 50 % and more success on the written part. The final grade of the subject is the sum points obtained during the semester and the exam as the percentage of the accepted knowledge and skills, namely: 90-100 - excellent (5) 80-89,9 - very good (4) 65- 79,9 - good (3) 50- 64,9 - sufficient (2)
Student activities:	Aktivnost (Constantly tested knowledge) ECTS 2 (Practical work) 1 (Oral exam) 2
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot pass this course unless they have passed Hidrologija i hidraulika Students cannot enroll in this course unless they have passed Osnove hidrologije i hidraulike Students cannot enroll in this course unless they have passed Zaštita okoliša Students cannot enroll in this course unless they have passed Proračun konstrukcija



	Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have completed Hidrologija i hidraulika
ISVU equivalents:	22377;155939;
Proposal made by	Gorana Čosić-Flajisg, M.sc., Senior Lecturer, 28.06.2018.

Code WEB/ISVU	23921/184649	ECTS	5.0	Academic year	2018/2019
Name	Wooden Structures				
Status	3rd semester - Undergraduate professional study in civil engineering (Redovni graditeljstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home				30+30 (14+0+0+16) 90
Teachers	Lectures:1. doc. dr. sc. Dean Čizmar dipl. ing. građ. Lectures:2. prof.vis.šk. Boris Baljkas Auditory exercises:doc. dr. sc. Dean Čizmar dipl. ing. građ. Auditory exercises: Šime Serdarević mag. ing. aedif. Construction exercises:doc. dr. sc. Dean Čizmar dipl. ing. građ. Construction exercises: Šime Serdarević mag. ing. aedif.				
Course objectives	Students are prepared to participate in the supervision or construction of timber structures (monolithic or glued-laminated timber structures) and structures made of plate-shaped materials, with a particular emphasis on durability and fire resistance.				
Learning outcomes:	1.calculate basic actions and combinations of actions for timber structure. Level:6 2.draw a timber-structure disposition with all elements for spatial stability. Level:6 3.calculate a simpler form of a timber structure. Level:6 4.check bearing capacity of structural elements. Level:6 5.design connections for timber structure members. Level:6,7 6.make a working drawing of a simpler timber structure with connection details. Level:6 7.prepare bill of quantities for timber. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration 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.				
Methods of carrying out auditory exercises	Interactive problem solving Other Students are given instructions and example for the preparation of individual programs.				
How construction exercises are held	Interactive problem solving Other Students are given instructions and example for the preparation of individual programs.				
Course content lectures	1.Historic overview of timber structures, 2h, Learning outcomes:1 2.Systems, methodology and examples of erected structures, 2h, Learning outcomes:1 3.Properties of solid, laminated timber and wood based materials , 2h, Learning outcomes:3 4.Durability and fire resistance, 2h, Learning outcomes:2 5.Design of solid timber structures, 2h, Learning outcomes:2,3 6.Design of laminated timber and wood based elements, 2h, Learning outcomes:4 7.Fasteners in timber structures, 2h, Learning outcomes:2,3 8.Joints with direct and indirect force distribution, 2h, Learning outcomes:6 9.Joints with direct and indirect force distribution, 2h, Learning outcomes:6 10.Assembled truss and bending elements , 2h, Learning outcomes:4 11.Design of joints (modern and carpentry), 2h, Learning outcomes:5 12.Spatial stability of timber structures, 2h, Learning outcomes:5 13.Basis of joint design of laminated timber structures, 2h, Learning outcomes:3 14.Basis of joint design of laminated timber structures, 2h, Learning outcomes:3 15.Transporting and erecting of timber structures, 2h, Learning outcomes:6,7				
Course content auditory	1.Introduction about project. Description of a project, structural system and guidelines. , 2h, Learning outcomes:1 2.Elements of layout., 2h, Learning outcomes:1,5 3.Elements of layout., 2h, Learning outcomes:1,5 4.- 5.- 6.Design according to Eurocode 5. Load analysis. Static check and design of secondary structural elements., 2h, Learning outcomes:3,4 7.- 8.Design of main structure according to EC5. Spatial stability of main structure., 2h, Learning outcomes:3,4 9.Examples of design of simple elements according to EC5, 2h, Learning outcomes:3,4 10.- 11.- 12.Fasteners in timber structures. Design of details. Execution details. Description of a project. , 2h, Learning outcomes:6,7 13.- 14.- 15.-				
Course content constructs	1.- 2.- 3.- 4.Elements of layout., 2h, Learning outcomes:1,5 5.Elements of layout., 2h, Learning outcomes:1,5 6.- 7.Design of secondary structure., 2h, Learning outcomes:3,4				

	8.- 9.- 10.Design of main structure according to EC5, 2h, Learning outcomes:3,4 11.Design of main structure according to EC5, 2h, Learning outcomes:3,4 12.- 13.Details in timber , 2h, Learning outcomes:6,7 14.Details in timber , 2h, Learning outcomes:6,7 15.Details in timber structures (final corrections) , 2h, Learning outcomes:1,2,3,4,5,6										
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment Each student will prepare a 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.										
Exam literature	Osnovna: 1. M. Magerle: Drvene konstrukcije, Svojstva drva, PTI, IGH, Zagreb, 1996 (Sveučilišni udžbenik) 2. Z. Žagar: Drvene konstrukcije , Svezak I, Osnove projektiranja drvenih konstrukcija, Pretei, Zagreb, 1999. Sveučilišni udžbenik); 3. A. Bjelanović, V. Rajčić: Drvene konstrukcije preme europskim normama, Građevinski fakultet, 2007. 4. Pisani materijal pripremljen od nastavnika. Additional literature: 1. Handbook 1 - Timber structures, TEMTIS, 2008. 2. Handbook 2 - Design of timber structures according to EC5, TEMTIS, 2008. 3. M.Goeggel : Bemesung im Holzbau, Konstruktionsregeln, Formeln, Tafeln, Rechenwegwe in Beispielen, Bauverlag GmbH, Wisbaden und Berlin, 1980 4. EUROCODE 1995-1-1.; Design of Timber Structures, Part 1-1, General rules for buildings										
Students obligations	Minimal 25% of total points on design project and colloquium										
Knowledge evaluation during semester	Approved design project (30 points max) Colloquium (30 points max)										
Knowledge evaluation after semester	Written part of examination (40 points): solving problems (practical part) and answering questions (theoretical part) Students with 50% or more on colloquium write only theoretical part. Other must pass practical part and theoretical part										
Student activities:	<table> <tr> <td>Aktivnost</td><td>ECTS</td></tr> <tr> <td>(Constantly tested knowledge)</td><td>2</td></tr> <tr> <td>(Practical work)</td><td>1</td></tr> <tr> <td>(Written exam)</td><td>1</td></tr> <tr> <td>(Oral exam)</td><td>1</td></tr> </table>	Aktivnost	ECTS	(Constantly tested knowledge)	2	(Practical work)	1	(Written exam)	1	(Oral exam)	1
Aktivnost	ECTS										
(Constantly tested knowledge)	2										
(Practical work)	1										
(Written exam)	1										
(Oral exam)	1										
Remark	This course can be used for final thesis theme										
Prerequisites:	Students cannot pass this course unless they have passed Proračun konstrukcija Students cannot enroll in this course unless they have completed Građevinski materijali Students cannot enroll in this course unless they have passed Matematika I Students cannot enroll in this course unless they have passed Nacrtna geometrija u graditeljstvu I Students cannot enroll in this course unless they have completed Proračun konstrukcija										
ISVU equivalents:	22349;155930;										
Proposal made by	Dr. sc. Dean Čizmar dipl. ing. građ., 20.6.2018.										