Semester 1		
Undergraduate professional study in computing obligatory courses		
P: Alemka Knapp P:prof.vis.šk. Ivica Levanat A: Alemka Knapp A: Diana Šaponja-Milutinović dipl.ing.fizike, pred.	Physics	ECTS:7.0
A: Marko Milanović	Kinesiology Education I	ECTS:1.0
P: Tihana Strmečki A: Tihana Strmečki	Mathematics I	ECTS:7.0
P: Danijela Pongrac , prof. L: Danijela Pongrac , prof. L:prof. Marta Alić	Computer Applications	ECTS:5.0
P: Ivan Cesar mag. ing. P: Mia Čarapina dipl. ing., pred. L:dr.sc.rač. Ivica Dodig , prof.v.š. A: Mia Čarapina dipl. ing., pred. L: Mia Čarapina dipl. ing., pred. A: Ivan Cesar mag. ing. L: Ivan Cesar mag. ing.	Programming	ECTS:7.0
Undergraduate professional study in computing elective courses		
P:dr.sc. Biljana Stojaković ,prof.v.š. u trajnom zvanju A:dr.sc. Ivana Špiranec prof. visoke škole A: Zoran Vulelija	English for Computing	ECTS:3.0
P: Doc. dr. sc. Lidija Tepeš Golubić v. pred. A: Doc. dr. sc. Lidija Tepeš Golubić v. pred.	German for computing	ECTS:3.0

Semester 2		
Undergraduate professional study in computing obligatory courses		
A: Marko Milanović	Kinesiology Education II	ECTS:1.0
P: Tihana Strmečki A: Tihana Strmečki	Mathematics II	ECTS:7.0
P:Prof. dr. sc. Miroslav Slamić profesor visoke škole L:Prof. dr. sc. Miroslav Slamić profesor visoke škole L: Željko Kovačević , struč.spec.ing.techn.inf. L: Ivan Cesar mag. ing. L:Dr. sc. Aleksandar Stojanović pred. L: Martina Petrovečki struč.spec.ing.techn.inf.	Object Oriented Programming	ECTS:7.0
P: Željko Stojanović A: Eugen Poljičak mag.ing.eit L: Eugen Poljičak mag.ing.eit	Electrical Engineering and Electronics Basics	ECTS:7.0
P: Sanja Kraljević , dipl.ing., v. pred. L:dr. sc. Roman Domović , prof. L: Petar Osterman L: Sanja Kraljević , dipl.ing., v. pred.	Introduction to WEB Technologies	ECTS:5.0
Undergraduate professional study in computing elective courses		
P:dr.sc. Biljana Stojaković ,prof.v.š. u trajnom zvanju A: Zoran Vulelija	Business English for Computing	ECTS:3.0
P: Doc. dr. sc. Lidija Tepeš Golubić v. pred. A: Doc. dr. sc. Lidija Tepeš Golubić v. pred.	Business German for computing	ECTS:3.0

Semester 3

	Software engineering obligatory courses	
P:Prof. dr. sc. Miroslav Slamić profesor visoke škole A:Prof. dr. sc. Miroslav Slamić profesor visoke škole L: Željko Kovačević , struč.spec.ing.techn.inf. L:Dr. sc. Aleksandar Stojanović pred. L: Danko Ivošević pred.	Algorithms and Data Structures	ECTS:7.0
P:dr.sc.rač. Ivica Dodig , prof.v.š. P:dr.sc.rač. Davor Cafuta , prof.v.šk. A: Jelena Kapelac L: Jelena Kapelac	Computer Architecture	ECTS:7.0
A: Marko Milanović	Kinesiology Education III	ECTS:1.0
P:dr.sc.rač. Davor Cafuta , prof.v.šk. P:dr.sc.rač. Ivica Dodig , prof.v.š. L:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Ivica Dodig , prof.v.š.	Operating Systems	ECTS:6.0
P:v.pred. Aleksander Radovan , dipl. ing. A:v.pred. Aleksander Radovan , dipl. ing. L: Davor Lozić pred. L: Tin Kramberger struč. spec. ing. techn. inf., pred.	Java Programming	ECTS:5.0
P:dr.sc. Igor Urbiha prof.vis.šk. A:dr.sc. Igor Urbiha prof.vis.šk.	Probability and Statistics	ECTS:6.0
	Computer systems and network engineering obligatory courses	
P:Prof. dr. sc. Miroslav Slamić profesor visoke škole A:Prof. dr. sc. Miroslav Slamić profesor visoke škole L: Željko Kovačević , struč.spec.ing.techn.inf. L:Dr. sc. Aleksandar Stojanović pred. L: Danko Ivošević pred.	Algorithms and Data Structures	ECTS:7.0
P:dr.sc.rač. Ivica Dodig , prof.v.š. P:dr.sc.rač. Davor Cafuta , prof.v.šk. A: Jelena Kapelac L: Jelena Kapelac	Computer Architecture	ECTS:7.0
A: Marko Milanović	Kinesiology Education III	ECTS:1.0
P:dr.sc.rač. Davor Cafuta , prof.v.šk. P:dr.sc.rač. Ivica Dodig , prof.v.š. L:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Ivica Dodig , prof.v.š.	Operating Systems	ECTS:6.0
P:v.pred. Aleksander Radovan , dipl. ing. A:v.pred. Aleksander Radovan , dipl. ing. L: Davor Lozić pred. L: Tin Kramberger struč. spec. ing. techn. inf., pred.	Java Programming	ECTS:5.0
P:dr.sc. Igor Urbiha prof.vis.šk. A:dr.sc. Igor Urbiha prof.vis.šk.	Probability and Statistics	ECTS:6.0

Semester 4

	Software engineering obligatory courses	
P: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Renata Kramberger A: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Brigitta Cafuta	Databases	ECTS:5.0
A: Marko Milanović	Kinesiology Education IV	ECTS:1.0
P: Nikolina Kasunić struč.spec.ing.techn.inf. P: Dunja Bjelobrk Knežević dipl.ing L: Dunja Bjelobrk Knežević dipl.ing L: Nikolina Kasunić struč.spec.ing.techn.inf.	Computer Networks	ECTS:6.0
P:dr.sc.rač. Davor Cafuta , prof.v.šk. P: Tin Kramberger struč. spec. ing. techn. inf., pred. P:dr.sc.rač. Ivica Dodig , prof.v.š. P: Ivan Cesar mag. ing. P: Ognjen Mitrović struč. spec. ing. techn. inf., pred. L:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Ivica Dodig , prof.v.š. L: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Ivan Cesar mag. ing.	Computing system security	ECTS:5.0
P:dr.sc.rač. Ivica Dodig , prof.v.š. P:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Davor Cafuta , prof.v.šk.	Introduction to Unix Systems	ECTS:4.0
	Software engineering elective courses	
P:Pred. Ida Popčević prof. L:Pred. Ida Popčević prof.	Communication Skills	ECTS:4.0
P:dr.sc.rač. Davor Cafuta , prof.v.šk. P:dr.sc.rač. Ivica Dodig , prof.v.š. L:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Ivica Dodig , prof.v.š.	Open Development Platforms for Embedded Systems	ECTS:5.0
P:dr.sc. Alen Šimec v. predavač L:dr.sc. Alen Šimec v. predavač L: Petar Osterman	Web application development	ECTS:5.0
P:Dr. sc. Marko Horvat v. pred. L:Dr. sc. Marko Horvat v. pred. L: Tamara Ivelja mag. ing. geod. et. geoinf. L: Domagoj Tuličić	Introduction to Artificial Intelligence	ECTS:4.0
	Computer systems and network engineering obligatory courses	
P: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Renata Kramberger A: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Brigitta Cafuta	Databases	ECTS:5.0

A: Marko Milanović	Kinesiology Education IV	ECTS:1.0
P: Nikolina Kasunić struč.spec.ing.techn.inf. P: Dunja Bjelobrk Knežević dipl.ing L: Dunja Bjelobrk Knežević dipl.ing L: Nikolina Kasunić struč.spec.ing.techn.inf.	Computer Networks	ECTS:6.0
P:dr.sc.rač. Davor Cafuta , prof.v.šk. P: Tin Kramberger struč. spec. ing. techn. inf., pred. P:dr.sc.rač. Ivica Dodig , prof.v.š. P: Ivan Cesar mag. ing. P: Ognjen Mitrović struč. spec. ing. techn. inf., pred. L:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Ivica Dodig , prof.v.š. L: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Ivan Cesar mag. ing.	Computing system security	ECTS:5.0
P:dr.sc.rač. Ivica Dodig , prof.v.š. P:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Davor Cafuta , prof.v.šk.	Introduction to Unix Systems	ECTS:4.0
Computer systems and network engineering elective courses		
P:Pred. Ida Popčević prof. L:Pred. Ida Popčević prof.	Communication Skills	ECTS:4.0
P:dr.sc.rač. Davor Cafuta , prof.v.šk. P:dr.sc.rač. Ivica Dodig , prof.v.š. L:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Ivica Dodig , prof.v.š.	Open Development Platforms for Embedded Systems	ECTS:5.0
P:dr.sc. Alen Šimec v. predavač L:dr.sc. Alen Šimec v. predavač L: Petar Osterman	Web application development	ECTS:5.0
P:Dr. sc. Marko Horvat v. pred. L:Dr. sc. Marko Horvat v. pred. L: Tamara Ivelja mag. ing. geod. et. geoinf. L: Domagoj Tuličić	Introduction to Artificial Intelligence	ECTS:4.0

Semester 5

Software engineering obligatory courses		
P: Željko Stojanović P:dr.sc. Mladen Mauher prof.v.šk. P:dr.sc. Biljana Stojaković ,prof.v.š. u trajnom zvanju P:v.pred. Aleksander Radovan , dipl. ing. P: Danijela Pongrac , prof. P:Pred. Ida Popčević prof. P: Željko Kovačević , struč.spec.ing.techn.inf. P: Mario Janković mag. ing. graph. techn. P: Ognjen Mitrović struč. spec. ing. techn. inf., pred. P: Ivan Cesar mag. ing. P:Dr. sc. Aleksandar Stojanović pred. P: Goran Belamarić viši predavač P:dr.sc. Željko Širanović prof.v.š. P:dr.sc.rač. Davor Cafuta , prof.v.šk. P:dr.sc.rač. Ivica Dodig , prof.v.š. P: Vesna Alić-Kostešić dipl.ing.stroj. P: Dunja Bjelobrk Knežević dipl.ing P: Mia Čarapina dipl. ing., pred. P:dr. sc. Roman Domović , prof. P: Sanja Kraljević , dipl.ing., v. pred. P:Dr. sc. Marko Horvat v. pred. P:izv. prof. dr. sc. Petar Jandrić prof. v. šk. P: Tin Kramberger struč. spec. ing. techn. inf., pred. P:mr.sc. Sergej Lugović MBA P: Nikola Majstorović dipl.ing. P:mr.sc. Goran Malčić v.pred. P: Vedrana Novinc P: Bojan Nožica dipl. ing, v.pred. P:Prof. dr. sc. Miroslav Slamić profesor visoke škole P:dr.sc. Alen Šimec v. predavač P:dr.sc. Igor Urbiha prof.vis.šk. P: Ognjen Staničić dipl. ing.	Seminar Paper	ECTS:6.0
Software engineering elective courses		
P: Dunja Bjelobrk Knežević dipl.ing L: Dunja Bjelobrk Knežević dipl.ing L: Nikolina Kasunić struč.spec.ing.techn.inf.	Computer Networks Administration	ECTS:5.0
P:dr.sc.rač. Davor Cafuta , prof.v.šk. P:dr.sc.rač. Ivica Dodig , prof.v.š. L:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Ivica Dodig , prof.v.š. L: Andrej Vitez	UNIX Systems Administration	ECTS:5.0
P: Ognjen Mitrović struč. spec. ing. techn. inf., pred. P:dr.sc. Željko Širanović prof.v.š. L:dr.sc. Željko Širanović prof.v.š. L: Vedran Tadić struč.spec.ing.techn.inf. L: Ognjen Mitrović struč. spec. ing. techn. inf., pred.	Network Services	ECTS:5.0
P: Sanja Kraljević , dipl.ing., v. pred. A: Sanja Kraljević , dipl.ing., v. pred. L: Jakob Gračanin L: Sanja Kraljević , dipl.ing., v. pred.	Advanced Databases	ECTS:5.0
P: Ognjen Staničić dipl. ing. L: Ognjen Staničić dipl. ing.	Advanced JavaScript programming	ECTS:5.0

P:Prof. dr. sc. Miroslav Slamić profesor visoke škole P:Dr. sc. Aleksandar Stojanović pred. L:Dr. sc. Aleksandar Stojanović pred.	Advanced Programming in Python	ECTS:5.0
P: Dunja Bjelobrk Knežević dipl.ing L: Dunja Bjelobrk Knežević dipl.ing	Soft Computing Methods	ECTS:6.0
P: Mario Janković mag. ing. graph. techn. P:dr.sc. Maja Turčić pred. L:dr.sc. Maja Turčić pred. L: Mario Janković mag. ing. graph. techn.	Web Design	ECTS:6.0
P:mr.sc. Goran Malčić v.pred. L: Ivica Vlašić	Automation and Computer Process Control	ECTS:5.0
P: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Renata Kramberger	Computer Games Development	ECTS:5.0
Computer systems and network engineering obligatory courses		
P: Dunja Bjelobrk Knežević dipl.ing L: Dunja Bjelobrk Knežević dipl.ing L: Nikolina Kasunić struč.spec.ing.techn.inf.	Computer Networks Administration	ECTS:5.0
P:dr.sc.rač. Davor Cafuta , prof.v.šk. P:dr.sc.rač. Ivica Dodig , prof.v.š. L:dr.sc.rač. Davor Cafuta , prof.v.šk. L:dr.sc.rač. Ivica Dodig , prof.v.š. L: Andrej Vitez	UNIX Systems Administration	ECTS:5.0
P: Željko Stojanović P:dr.sc. Mladen Mauher prof.v.šk. P:dr.sc. Biljana Stojaković ,prof.v.š. u trajnom zvanju P:v.pred. Aleksander Radovan , dipl. ing. P: Danijela Pongrac , prof. P:Pred. Ida Popčević prof. P: Željko Kovačević , struč.spec.ing.techn.inf. P: Mario Janković mag. ing. graph. techn. P: Ognjen Mitrović struč. spec. ing. techn. inf., pred. P: Ivan Cesar mag. ing. P:Dr. sc. Aleksandar Stojanović pred. P: Goran Belamarić viši predavač P:dr.sc. Željko Širanović prof.v.š. P:dr.sc.rač. Davor Cafuta , prof.v.šk. P:dr.sc.rač. Ivica Dodig , prof.v.š. P: Vesna Alić-Kostešić dipl.ing.stroj. P: Dunja Bjelobrk Knežević dipl.ing P: Mia Čarapina dipl. ing., pred. P:dr. sc. Roman Domović , prof. P: Sanja Kraljević , dipl.ing., v. pred. P:Dr. sc. Marko Horvat v. pred. P:izv. prof. dr. sc. Petar Jandrić prof. v. šk. P: Tin Kramberger struč. spec. ing. techn. inf., pred. P:mr.sc. Sergej Lugović MBA P: Nikola Majstorović dipl.ing. P:mr.sc. Goran Malčić v.pred. P: Vedrana Novinc P: Bojan Nožica dipl. ing, v.pred. P:Prof. dr. sc. Miroslav Slamić profesor visoke škole P:dr.sc. Alen Šimec v. predavač P:dr.sc. Igor Urbiha prof.vis.šk.	Seminar Paper	ECTS:6.0

P: Ognjen Staničić dipl. ing.

Computer systems and network engineering elective courses		
P: Ognjen Mitrović struč. spec. ing. techn. inf., pred. P:dr.sc. Željko Širanović prof.v.š. L:dr.sc. Željko Širanović prof.v.š. L: Vedran Tadić struč.spec.ing.techn.inf. L: Ognjen Mitrović struč. spec. ing. techn. inf., pred.	Network Services	ECTS:5.0
P: Sanja Kraljević , dipl.ing., v. pred. A: Sanja Kraljević , dipl.ing., v. pred. L: Jakob Gračanin L: Sanja Kraljević , dipl.ing., v. pred.	Advanced Databases	ECTS:5.0
P: Ognjen Staničić dipl. ing. L: Ognjen Staničić dipl. ing.	Advanced JavaScript programming	ECTS:5.0
P:Prof. dr. sc. Miroslav Slamić profesor visoke škole P:Dr. sc. Aleksandar Stojanović pred. L:Dr. sc. Aleksandar Stojanović pred.	Advanced Programming in Python	ECTS:5.0
P: Dunja Bjelobrk Knežević dipl.ing L: Dunja Bjelobrk Knežević dipl.ing	Soft Computing Methods	ECTS:6.0
P: Mario Janković mag. ing. graph. techn. P:dr.sc. Maja Turčić pred. L:dr.sc. Maja Turčić pred. L: Mario Janković mag. ing. graph. techn.	Web Design	ECTS:6.0
P:mr.sc. Goran Malčić v.pred. L: Ivica Vlašić	Automation and Computer Process Control	ECTS:5.0
P: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Renata Kramberger	Computer Games Development	ECTS:5.0

Semester 6

	Software engineering elective courses	
P:dr.sc. Maja Turčić pred. L:dr.sc. Maja Turčić pred.	eBook design	ECTS:5.0
P: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Tin Kramberger struč. spec. ing. techn. inf., pred.	Android application development	ECTS:6.0
P: Ivan Cesar mag. ing. L: Ivan Cesar mag. ing.	Web application development in ASP.NET MVC technology	ECTS:6.0
P:v.pred. Aleksander Radovan , dipl. ing. L: Matija Dujmović	Web application in Java	ECTS:6.0
	Software engineering elective courses	
P:dr.sc. Željko Širanović prof.v.š.	Final thesis	ECTS:19.0
	Computer systems and network engineering elective courses	
P:dr.sc. Maja Turčić pred. L:dr.sc. Maja Turčić pred.	eBook design	ECTS:5.0
P: Tin Kramberger struč. spec. ing. techn. inf., pred. L: Tin Kramberger struč. spec. ing. techn. inf., pred.	Android application development	ECTS:6.0
P: Ivan Cesar mag. ing. L: Ivan Cesar mag. ing.	Web application development in ASP.NET MVC technology	ECTS:6.0
P:v.pred. Aleksander Radovan , dipl. ing. L: Matija Dujmović	Web application in Java	ECTS:6.0
	Computer systems and network engineering elective courses	
P:dr.sc. Željko Širanović prof.v.š.	Final thesis	ECTS:19.0

Code WEB/ISVU	23080/85264	ECTS	5.0	Academic year	2018/2019
Name	Advanced Databases				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			15+45 (15+30+0+0) 90	
Teachers	Lectures: Sanja Kraljević , dipl.ing., v. pred. Auditory exercises: Sanja Kraljević , dipl.ing., v. pred. Laboratory exercises:1. Sanja Kraljević , dipl.ing., v. pred. Laboratory exercises: Jakob Gračanin				
Course objectives	To introduce students to objects and control of data access , the basics of programming MySQL servers and implementation of a database into an information system.				
Learning outcomes:	1.ability to compare different types of server-client architectures. Level:6,7 2.ability to remove database malfunctions. Level:6 3.ability to estimate the efficiency of a database model in an information system. Level:6,7 4.ability to distinguish between the structures of a centralised and a distributed database. Level:6 5.ability to compare the mechanisms used in database management. Level:6,7 6.ability to create objects by using a query language (SQL). Level:6 7.ability to develop the stored data (functions, procedures, triggers) by using advanced SQL techniques . Level:6,7 8.ability to control the flow and redirection of the SQL code flow. Level:6,7 9.ability to devise the control of a parallel data access by using various techniques: data locking, locking granularity and defining a level of data isolation. Level:6,7 10.abilityto control the permissions to and levels of data access . Level:6,7 11.ability to distinguish between the requests of a transaction system and those of a data warehousing system. Level:6 12.ability to identify the necessity for getting prompt information by using systems of business intelligence. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Discussion Questions and answers				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Computer simulations Interactive problem solving				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Group problem solving Discussion, brainstorming Interactive problem solving				
Course content lectures	1. Introductory lecture, 2h, Learning outcomes:1,3 2.DDL, DML, embedded functions, Cartesian / JOIN, 2h, Learning outcomes:2 3.Aliases, subqueries, indexes, normalization, 2h, Learning outcomes:5 4.Database transactions, 2h, Learning outcomes:5,6 5.Procedures and functions, 2h, Learning outcomes:6,7 6.Cursors, flow control, 2h, Learning outcomes:7,8 7.Preparation for the first mid-term exam, 2h, Learning outcomes:1,2,3,4,5,6 8.First mid-term exam, 2h, Learning outcomes:1,2,3,4,5,6 9.Triggers, 2h, Learning outcomes:7,9 10.Data locking, 2h, Learning outcomes:9 11.Grant, 2h, Learning outcomes:10 12.Connectivity, 2h, Learning outcomes:8,9,10 13.Data warehouse, 2h, Learning outcomes:11,12 14.Preparation for the second mid-term exam, 2h, Learning outcomes:7,8,9,10,11,12 15.Second mid-term exam, 2h, Learning outcomes:7,8,9,10,11,12				
Course content auditory	1.No classes 2.No classes 3.No classes 4.No classes 5.No classes 6.No classes 7.No classes 8.No classes 9.No classes 10.No classes 11.No classes 12.No classes 13.No classes 14.No classes 15.No classes				
Course content laboratory	1.No classes 2.No classes				

3.Database fundamentals, 2h, Learning outcomes:1,2,3,4,5
4.Transactions, 2h, Learning outcomes:5,6,7
5.Procedures, functions, 2h, Learning outcomes:6,7,8
6.Flow control, 2h, Learning outcomes:6,7,8
7.Cursors, 2h, Learning outcomes:7,8
8.First midterm exam, 2h
9.Triggers, 2h, Learning outcomes:7
10.Data locks, 2h, Learning outcomes:9
11.Grant, 2h, Learning outcomes:9,10
12.Connectivity, 2h, Learning outcomes:11,12
13.Injection prevention, 2h, Learning outcomes:9,10
14.No classes
15.Second midterm exam, 2h, Learning outcomes:11,12

Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector Tools
Exam literature	Basic literature: 1. Skripta iz kolegija, prezentacije s predavanja 2. MySQL Documentation: MySQL Reference Manuals Additional literature: 1. Manger; R.: Baze podataka, skripta, Sveučilište u Zagrebu, Prirodoslovno Matematički fakultet, drugo izdanje, Zagreb, 2014. 2. Balling, D. J. ; Zawodny, J.: High Performance MySQL, O'Reilly, 2015. 3. Vaswani, V.; MySQL Database Usage Administration, McGraw-Hill Osborne Media, 2010. 4. Cabral, S.; Murphy, K.: MySQL Administrator's Bible, Wiley Publishing, Inc., Indianapolis, Indiana, 2009. 5. Ramakrishnan, R.; Gehrke, J.: Database Management Systems, 3rd Edition, McGraw- Hill, New York, 2003. 6. Sumathi, S.; Esakkirajan, S.: Fundamentals of Relational Database Management Systems, Springer, Verlag Berlin Heidelberg, 2007.
Students obligations	1. Done laboratory exercises (tolerance 1/6 absences). 2. Achieved minimum of 15 points of laboratory exercises (out of 50).
Knowledge evaluation during semester	Short exam is written on each laboratory exercises: holds 8 points, in each of the five labs (except laboratory exercise zero) can be won up to 8 points -> maximum 40 points from all exercises, exception: laboratory exercise zero holds 10 points. Distribution of total number of points from mid-term exams: 25% first mid-term exam, 25% second mid-term exam, 10% laboratory exercise zero, 40% remaining laboratory exercises. The first and second mid-term exam include material previously handled in lectures and laboratory exercises. Pass -> 50 % (50 bodova), Best results -> will be exempt from second mid term exam with "excellent (5)" grade, (criterion is the maximum number of points in two mid term exams and all labs, minus 10%).
Knowledge evaluation after semester	Written and oral exam. Final grade from written exam: 60% written exam, 40% laboratory exercises.
Student activities:	Aktivnost ECTS (Written exam) 5
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have completed Baze podataka
ISVU equivalents:	22718;75210;172325;
Proposal made by	Sanja Duk, dipl. ing.

Code WEB/ISVU	23494/156035	ECTS	5.0	Academic year	2018/2019
Name	Advanced JavaScript programming				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 90	
Teachers	Lectures:1. Ognjen Staničić dipl. ing. Laboratory exercises: Ognjen Staničić dipl. ing.				
Course objectives	Learning modern JavaScript frameworks with the emphasis on AngularJS. Learning to develop web apps using AngularJS and PHP. Learning to develop web apps using fullstack JavaScript based on the MEAN stack (AngularJS, Express, Node.js, MongoDB).				
Learning outcomes:	1.construct interactive web content using HTML DOM, CSS and JavaScript. Level:6,7 2.differentiate between JavaScript Events and their triggering in time and on demand. Level:6 3.design a web app based on the JavaScript programming language. Level:6 4.construct a web app using the AngularJS framework. Level:6,7 5.develop a web server using the Node.js environment. Level:6,7 6.build a noSQL database using the Mongo database. Level:6,7 7.analize the MVC programming paradigm. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Questions and answers				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web				
Course content lectures	1.Introductory lecture, 2h, Learning outcomes:1,2 2.JavaScript fundamentals, 2h, Learning outcomes:1,2 3.Advanced JavaScript concepts, 2h, Learning outcomes:1,2 4.Angular - introduction, MVC, components, 2h, Learning outcomes:3,4,7 5.Angular - modules and directives, 2h, Learning outcomes:3,4,7 6.Angular - filters, services, $http, 2h, Learning outcomes:3,4,7 7.Angular and forms, 2h, Learning outcomes:3,4 8.Angular and PHP, 2h, Learning outcomes:3,4 9.Node.js, 2h, Learning outcomes:3,4,5 10.Express - fundamentals, 2h, Learning outcomes:3,5 11.Express - routing, APIs, 2h, Learning outcomes:3,5 12.MongoDB 1, 2h, Learning outcomes:3,6 13.Developing a MEAN web app, 2h, Learning outcomes:3,4,5,6,7 14.Related technologies, 2h, Learning outcomes:3,4,5,6,7 15.No class, 2h				
Course content laboratory	1.No class, 2h 2.No class, 2h 3.JavaScript, 2h, Learning outcomes:1,2 4.Angular - uvod, 2h, Learning outcomes:3,4,7 5.Angular - moduli i direktive, 2h, Learning outcomes:3,4,7 6.Angular - filteri, servisi, $http, 2h, Learning outcomes:3,4,7 7.Angular i forme, 2h, Learning outcomes:3,4 8.Node.js, 2h, Learning outcomes:3,5 9.Express, 2h, Learning outcomes:3,5 10.MongoDB, 2h, Learning outcomes:4,6 11.Project, 2h, Learning outcomes:3,4,5,7 12.Project, 2h, Learning outcomes:3,4,5,7 13.Project, 2h, Learning outcomes:3,4,5,7 14.No class, 2h 15.No class, 2h				
Required materials	General purpose computer laboratory Whiteboard with markers Overhead projector				
Exam literature	1. "Eloquent JavaScript: A Modern Introduction to Programming" Marijn Haverbeke 2. "Pro AngularJS" Adam Freeman 3. "Professional Node.js" Pedo Teixeira 4. "Mean Machine" Chris Sevilleja, Holly Lloyd				
Students obligations	Regular attendance of classes and lectures				
Knowledge evaluation during semester	Regular attendance, programming exercises and quizzes in labs, project				
Knowledge evaluation after	Written and oral exam, project				

semester	
Student activities:	Aktivnost ECTS (Project) 3 (Practical work) 2
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Baze podataka Students cannot enroll in this course unless they have passed Programiranje u jeziku Java Students cannot enroll in this course unless they have passed Uvod u web tehnologije
Proposal made by	dipl. ing. Ognjen Staničić , 11.5.2016

Code WEB/ISVU	23223/142130	ECTS	5.0	Academic year	2018/2019
Name	Advanced Programming in Python				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 90	
Teachers	Lectures:Prof. dr. sc. Miroslav Slamić profesor visoke škole Lectures:Dr. sc. Aleksandar Stojanović pred. Laboratory exercises:Dr. sc. Aleksandar Stojanović pred.				
Course objectives	1) acquire basic skills in programming in Python by applying it in various types of problems, 2) practice problem solving, 3) get familiar with useful areas of computer science				
Learning outcomes:	1.write the program. Level:6,7 2.design system architecture. Level:6 3.build a system for a simple query language. Level:6,7 4.identify system komponents. Level:6 5.analyze system requirements and functionality. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Modelling Discussion Questions and answers				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment				
Course content lectures	1.Introduction to Python, 2h, Learning outcomes:1 2.Built-in data structures: Lists, tuples, maps and sets, 2h, Learning outcomes:1 3.Input/output, files and exceptions, 2h, Learning outcomes:1 4.Higher-order functions and recursion, 2h, Learning outcomes:1 5.Example of higher-order functions: Number system conversion, 2h, Learning outcomes:1 6.Example of recursion: Pattern matching, 2h, Learning outcomes:1 7.Environments, 2h, Learning outcomes:1,2,3,4,5 8.Classes and objects, 2h, Learning outcomes:1,2,3,4,5 9.Example of classes and objects: Logic circuit simulator, 2h, Learning outcomes:1,2,3,4,5 10.Iterators and the , 2h, Learning outcomes:1,2,3,4,5 11.Example of classes, objects and iterators: Implementation of relational algebra operators for data retrieval, 2h, Learning outcomes:1,2,3,4,5 12.Using Python for language processing: Fundamentals of grammars, finite state automata and regular expressions, 2h, Learning outcomes:2,3,4,5 13.Example: Parsing textual data, 2h, Learning outcomes:1,2,3,4,5 14.Example: Interpreter for a simple programming language, 2h, Learning outcomes:1,2,3,4,5 15.Overview of selected advanced parts of Python, 2h, Learning outcomes:1,2,3,4,5				
Course content laboratory	1.Introduction to Python: Lab assignments, 2h, Learning outcomes:1 2.Built-in data structures: Lists, tuples, maps and sets: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 3.Input/output, files and exceptions: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 4.Higher-order functions: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 5.Recursion: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 6.Recursion: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 7.Environments: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 8.Classes and objects: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 9.Classes and objects: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 10.Iterators and the , 2h, Learning outcomes:1,2,3,4,5 11.Parsing textual data: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 12.Parsing textual data: Lab assignments, 2h, Learning outcomes:1,2,3,4,5 13.Interpreter for a simple programming language: Work on implementation, 2h, Learning outcomes:1,2,3,4,5 14.Interpreter for a simple programming language: Work on implementation, 2h, Learning outcomes:1,2,3,4,5 15.Overview of selected advanced parts of Python: Lab assignments, 2h, Learning outcomes:1,2,3,4,5				
Required materials	General purpose computer laboratory Overhead projector				
Exam literature	1. L. Budin, P. Brođanac, Z. Markučič, S. Perić: Napredno rješavanje problema programiranjem u Pythonu, Element, 2013. 2. A. Stojanović: Elementi računalnih programa s primjerima u Pythonu i Scali, Element, 2012. 3. M. Lutz: Learning Python, O'Reilly Media, 2014. 4. P. Gries, J. Campbell, J. Montojo: Practical Programming: An Introduction to Computer Science Using Python 3, The Pragmatic Programmers, 2013. 5. C. Dierbach: Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Wiley, 2013. 6. H. Abelson, G. Sussman: Structure and Interpretation of Computer Programs, 2nd ed., MIT Press, 1996.				
Students obligations	Classes * 50% lectures/labs Grading * two tests (grade will be the average of the two)				

Knowledge evaluation during semester	* 2 tests
Knowledge evaluation after semester	* homework
Student activities:	Aktivnost ECTS (Written exam) 5
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Programiranje
Proposal made by	mr.sc. Aleksandar Stojanović

Code WEB/ISVU	23366/154952	ECTS	7.0	Academic year	2018/2019
Name	Algorithms and Data Structures				
Status	3rd semester - Software engineering (Redovni raarstvo) - obligatory course3rd semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+45 (15+30+0+0) 135	
Teachers	Lectures:1. Prof. dr. sc. Miroslav Slamić profesor visoke škole Auditory exercises:Prof. dr. sc. Miroslav Slamić profesor visoke škole Laboratory exercises: Danko Ivošević pred. Laboratory exercises: Željko Kovačević , struč.spec.ing.techn.inf. Laboratory exercises:Dr. sc. Aleksandar Stojanović pred.				
Course objectives	To transfer to students the basic knowledge related to standard data structures (lists, stacks, queues, binary trees) and algorithms used for work with data structures in C, C++, C# and Java				
Learning outcomes:	1.ability to compare the present algorithms; to analyse complex algorithms. Level:6,7 2.ability to develop complex recursive algorithms. Level:6,7 3.ability to create solutions based on simple data structures (lists, stacks, queues). Level:6,7 4.ability to devise solutions based on complex data structures (trees, piles and priority queue). Level:6,7 5.ability to propose the best program solutions based on sort algorithms . Level:6,7 6.ability to combine the best methods of browsing and using addressing techniques . Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Discussion, brainstorming				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations				
Course content lectures	1.Structured and unstructured data. Definitions of algorithms, history, conventions and writing algorithms., 2h, Learning outcomes:1 2.Algorithm complexity, 2h, Learning outcomes:1 3.Application of recursion in algorithms, 2h, Learning outcomes:2 4.Simple data structure. Static and dynamic data structures, 2h, Learning outcomes:1,3 5.Single and double linked lists, 2h, Learning outcomes:2,3 6.Data structure type Stack, 2h, Learning outcomes:3 7.Data structure type Queue, 2h, Learning outcomes:3 8.Complex Data Structures - Trees, 2h, Learning outcomes:4 9.Binary Tree, 2h, Learning outcomes:4 10.The heap and the priority queue as a binary tree, 2h, Learning outcomes:4 11.Simple sort algorithms., 2h, Learning outcomes:1,5 12.Fast sorting algorithms , 2h, Learning outcomes:1,4,5 13.Search algorithms. Sequential search, binary search and BST, 2h, Learning outcomes:4,5 14.Techniques of direct addressing and indexing, 2h, Learning outcomes:5,6 15.Hashing addressing. Applying Hash functions in the encryption of data, 2h, Learning outcomes:5				
Course content auditory	1.Fundamentals of mathematical algorithms., 1h, Learning outcomes:1 2.Analysis of the complexity of the algorithms., 1h, Learning outcomes:1 3.Implementation and analysis of recursion., 1h, Learning outcomes:2 4.Modeling simple data structure, 1h, Learning outcomes:1,3 5.Implementing the list (single and double linked). Implementation by array., 1h, Learning outcomes:2,3 6.Implementation of the stack., 1h, Learning outcomes:3 7.Implementation of the queue., 1h, Learning outcomes:3 8.Modeling of complex data structure of a tree., 1h, Learning outcomes:4 9.Implementation of the binary tree., 1h, Learning outcomes:4 10.Implementation of the priority queue and heap., 1h, Learning outcomes:4 11.Implementation of the simple sort algorithms., 1h, Learning outcomes:1,5 12.Implementation of the fast sort algorithms., 1h, Learning outcomes:1,4,5 13.Binary and sequential search., 1h, Learning outcomes:3,4 14.Implementing the techniques of direct addressing., 1h, Learning outcomes:5,6 15.Implementation techniques of Hash addressing., 1h, Learning outcomes:6				
Course content laboratory	1.Programming basic mathematical algorithms., 2h, Learning outcomes:1 2.Programming analysis of the complexity of the algorithms., 2h, Learning outcomes:1 3.Programming implementation and analysis of recursion., 2h, Learning outcomes:2 4.The programming model of simple data structures, 2h, Learning outcomes:1,3 5.Programming implementation of list (single and double linked). Implementation by array., 2h, Learning outcomes:2,3 6.Programming implementation of stack., 2h, Learning outcomes:3 7.Programming implemention of queue., 2h, Learning outcomes:3 8.The programming model complex data structure of a tree., 2h, Learning outcomes:4 9.Programming implementation of a binary tree., 2h, Learning outcomes:4 10.Programming implementation of a heap and priority queue., 2h, Learning outcomes:4 11.Programming implementation of of algorithms for sorting small arrays., 2h, Learning outcomes:5 12.Programming implementation of of fast algorithms for sorting large sequences., 2h, Learning outcomes:1,4,5 13.Software solution binary and sequential search., 2h, Learning outcomes:4,5				

	14.Programming implementation of techniques of direct addressing., 2h, Learning outcomes:5,6 15.Programming implementation of techniques Hash addressing., 2h, Learning outcomes:6
Required materials	General purpose computer laboratory Whiteboard with markers Overhead projector
Exam literature	Basic literature: 1. M. Slamić: Elektronički sadržaji predavanja (PPT prezentacije) na web stranici predmeta na Tehničkom veleučilištu u Zagrebu, 2012. www.tvz.hr. 2. R. Sedgewick: Algorithms in C/C++, Parts 1-4: Fundamentals, Data Structure, Sorting, Searching, Third Edition.. Additional literature: 3. Robert L. Kruse, Alexander J. Ryba: Data Structures and Program Design in C++, Prentice-Hall International, 2000. 4. R. Manger, M. Marušić: Strukture podataka i algoritmi, skripta, 3. izdanje, PMF-MO, 2007. http://web.math.pmf.unizg.hr/nastava/spa/. 5. Weiss: Data Structures and Algorithm Analysis in C, Addison-Wesley, 1997
Students obligations	To qualify for a signature is required to attend at least 70% of the total number of hours lectures, have performed at least 11 laboratory exercises and have a minimum of 15 of 30 possible points during the exercises.
Knowledge evaluation during semester	1. First mid-term (colloquium): max. 30 points 2. Second mid-term (kolokvia): max. 30 points 3. Two Quiz test: max 10 points (5 points each) 4. 12 lab. excercises (3 lab excercises for grade): max. 30 points. EVALUATION 90.01 to 100.00 points: excellent (5) 75.01-90.00 points: very good (4) 60.01-75.00 points: good (3) 50.01-60.00 points: sufficient (2)
Knowledge evaluation after semester	1. Writing exam - max. 70 points 2. Three lab excersises: max. 30 points. EVALUATION 90.01 to 100.00 points: excellent (5) 75.01-90.00 points: very good (4) 60.01-75.00 points: good (3) 50.01-60.00 points: sufficient (2)
Student activities:	Aktivnost ECTS (Written exam) 7
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Programiranje
ISVU equivalents:	22733;
Proposal made by	Dr. sc. Miroslav Slamić prof. vis. šk., 14.4.2014.

Code WEB/ISVU	23105/111519	**ECTS**	6.0	**Academic year**	2018/2019
Name	Android application development				
Status	6th semester - Software engineering (Redovni raarstvo) - elective course6th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home				30+30 (0+30+0+0) 120
Teachers	Lectures:1. Tin Kramberger struč. spec. ing. techn. inf., pred. Laboratory exercises: Tin Kramberger struč. spec. ing. techn. inf., pred.				
Course objectives	Acquiring the knowledge related to advanced Java techniques used for Android application development				

Learning outcomes:
1. to develop Android applications which are easy to upgrade and maintain. Level:6
2. to distinguish between Java application development and Android application development. Level:6
3. to organise a program code into classes, interfaces and packages according to OOP principles. Level:6,7
4. to write a program code for an application with a graphic interface, a business logic and a possibility of being connected with Web services and databases. Level:6,7
5. to design an Android application from its basics to a GUI. Level:6
6. to analyse the functional elements of an application and adjust them to Android architecture. Level:6
7. to sketch a concept design solution before its implementation. Level:6
8. to design an OO model of an Android application . Level:6,7
9. to set up the environment for efficient Android application development. Level:6,7
10. to develop ones own functional Android application. Level:6,7

Methods of carrying out lectures
Ex cathedra teaching
Case studies
Demonstration
Simulations
Modelling
Discussion
Questions and answers
Seminar, students presentation and discussion
Homework presentation

Methods of carrying out laboratory exercises
Laboratory exercises on laboratory equipment
Laboratory exercises, computer simulations
Group problem solving
Data mining and knowledge discovery on the Web
Discussion, brainstorming
Computer simulations
Workshop

Course content lectures
1. Introduction to Android, 2h, Learning outcomes:2,8,9,10
2. Activities, their lifecycle and GUI basics, 2h, Learning outcomes:6,7,8
3. GUI and ahitecture basics for Android program developing, 2h, Learning outcomes:4,6,7
4. Advanced GUI, animations, styles, intents, broadcast receivers, 2h, Learning outcomes:1,3,7
5. Working with controls for developing dialogs, menus and bundle, 2h, Learning outcomes:3,4
6. Settings and working with gridview, listview and recyclerview controls, 2h, Learning outcomes:3,4,5
7. Colloquium, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10
8. Fragments, 2h, Learning outcomes:1,3,5
9. Notifications, services, push, SD card data storage , 2h, Learning outcomes:1,3
10. Multi threading, working with local database, OR mapping, 2h, Learning outcomes:1,3
11. Developing and consuming web services, 2h, Learning outcomes:1,3
12. Working with sensors, bluetooth, NFC, WiFi, 2h, Learning outcomes:3,4,5,9
13. Developing applications for the home screen, multimedia, 2h, Learning outcomes:3,10
14. Android design patterns, 2h, Learning outcomes:7,8,9,10
15. Final exam, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10

Course content laboratory
1. Basics of Android Studio environment., 2h, Learning outcomes:2,6,7,10
2. Designing and calling activities, 2h, Learning outcomes:1,3,5,6,7,8
3. Designing a GUI, 2h, Learning outcomes:1,3,5,6,7,8
4. Advanced GUI design and multilanguage support, 2h, Learning outcomes:1,3,5,6,8
5. Construction of dialogs and controls, 2h, Learning outcomes:1,3,5,6,8
6. Making applications with lists and grids, 2h, Learning outcomes:1,3,5,6,8
7. Reimbursement of laboratory exercises, 2h, Learning outcomes:1,3,5,6,8
8. Developing application with fragments, 2h, Learning outcomes:1,3,5,6
9. Working with services and sending push notifications, 2h, Learning outcomes:1,3,4,5,6
10. Working with database, 2h, Learning outcomes:1,3,4,5,6
11. Developing web service and consuming it, libraries for image fetching, 2h, Learning outcomes:1,3,5,6
12. Developing home screen application, developing simple MP3 player, 2h, Learning outcomes:1,3,5,6
13. Connecting the device over NFC, WiFi and Bluetooth technology, 2h, Learning outcomes:1,3,4,5,6
14. Working with sensors, locations and maps, 2h, Learning outcomes:1,3,5,6
15. Reimbursement of laboratory exercises, 2h, Learning outcomes:1,3,5,6,7,8,9,10

Required materials
General purpose computer laboratory
Whiteboard with markers
Overhead projector

Exam literature
Reto Meier: Professional Android, Wrox, 2017
Dawn Griffiths : Head First Android Development: A Brain-Friendly Guide, O'Reilly, 2015

	Bill Phillips: Android Programming: The Big Nerd Ranch Guide (3rd Edition), Big Nerd Ranch Guides, 2017
Students obligations	maximum of 0 absences from exercises and at least 10% of total points.
Knowledge evaluation during semester	Teorijski dio svih ishoda uja, max. 20 bodova

Dva kolokvija po 10 bodova, prolaz >5 boda
Pozitivna ocjena iz teorije:
Oba kolokvija po > 5 bodova

Zavrni ispit 40 bodova, nema praga za prolaz

Vjebe, max. 40 bodova.
Ocjenjuje se priprema, zalaganje te sadraj i izgled projekta koji je dan za domazada
Kolokvij vjebi: pojedina obrana izvje uvjet je za pozitivnu ocjenu vjebi.

Ukupno, max. 100 bodova.
91 100 = 5
78 90 = 4
64 76 = 3
51 63 = 2
50 i manje, nedovoljno postignu

Student activities:	Aktivnost	ECTS
	(Written exam)	2
	(Practical work)	2
	(Seminar Work)	2
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Baze podataka
	Students cannot enroll in this course unless they have passed Programiranje u jeziku Java

Proposal made by	Tin Kramberger, 02.06.2017

Code WEB/ISVU	22963/22698	ECTS	5.0		Academic year	2018/2019
Name	Automation and Computer Process Control					
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - elective course					
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home				30+30 (0+30+0+0) 90	
Teachers	Lectures:1. mr.sc. Goran Malčić v.pred. Laboratory exercises: Ivica Vlašić					
Course objectives	To teach students how to solve problems related to implementation of computer systems used in automation of technical processes					
Learning outcomes:	1.ability to distinguish between computer systems intended for work in real time and the others . Level:6 2.ability to relate the elements of the system with software. Level:6,7 3.ability to sketch the control logic in a graphic programming language. Level:6 4.ability to develop a control program intended for simple systems. Level:6,7 5.ability to understand the connection between software, computer and the end elements of a system. Level:6					
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Discussion The lectures are based on presentations of particular control devices and micro-controlling systems.					
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Group problem solving Discussion, brainstorming Workshop Exercises are performed on PLC devices connected to your PC. Preparations for the exercise in the form of training courses for programmers to work on the devices.					
Course content lectures	1.Real-time computer controlled systems , 2h, Learning outcomes:1,2,3,4,5 2.Basic functional elements of industrial control systems, 2h, Learning outcomes:1,2,3,4,5 3.Programmable logic controller (PLC) as the main part of a control system, 2h, Learning outcomes:1,2,3,4,5 4.Types of processes and sequential and distributed control systems, 2h, Learning outcomes:1,2,3,4,5 5.Connection of the process with PLC circuits and addressing the external devices, 2h, Learning outcomes:1,2,3,4,5 6.Bit level instructions and Ladder diagram programming, 2h, Learning outcomes:1,2,3,4,5 7.Direct and indirect adressing, optimizing program code, 2h, Learning outcomes:1,2,3,4,5 8.Commands and work with timers, 2h, Learning outcomes:1,2,3,4,5 9.Commands and work with counters and high-speed counters, 2h, Learning outcomes:1,2,3,4,5 10.Pulse width modulation and pulse control device, 2h, Learning outcomes:1,2,3,4,5 11.Operation on data - comparison instructions and examples, 2h, Learning outcomes:1,2,3,4,5 12.Operation on data - mathematical instructions and examples, 2h, Learning outcomes:1,2,3,4,5 13.Commands and presentation of control by PLC computer, 2h, Learning outcomes:1,2,3,4,5 14.Instructions and changes of program flow control, 2h, Learning outcomes:1,2,3,4,5 15.Work with interruptive subroutines, 2h, Learning outcomes:1,2,3,4,5					
Course content laboratory	1.Basic units of programmable logic controller (PLC), 2h 2. Interaction with the environment and the PLC input and output control , 2h 3.Direct and indirect addressing, 2h 4.Programming language and the application development software, 2h 5.Application simulation on a PC, 2h 6.Operating with timers, 2h 7.Examples of work from timers, 2h 8.Operating with counters, 2h 9.Control switching equipment, sequential control, 2h 10.Examples of processes combined timers and counters, 2h 11.Analog modules, analog value scaling, 2h 12.Operating with analog values, 2h 13.Operating with mathematical instructions, 2h 14.Interruptive subroutines and operation jump start program, 2h 15.Writing the software project documentation, 2h					
Required materials	Basic: classroom, blackboard, chalk... Special purpose laboratory Special purpose computer laboratory Overhead projector PLC computer, switching equipment					
Exam literature	Basic literature: 1. G. Smiljanić, Računala i procesi, Školska knjiga, Zagreb, 1991. 2. F. Jović, Kompjutersko vođenje procesa, Zveza organizacij za tehničko kulturo Slovenije, Ljubljana, 1988. Additional literature: 3. S. Ribarić, Arhitektura mikroprocesora, Zagreb, 1988. 4. G.Malčić, D.Maršić, Interna skripta i podloge za vježbe 5. Hugh Jack, Automating Manufacturing Systems with PLCs, 2009.					
Students obligations	Mandatory attendance (80% level)					
Knowledge evaluation during semester	Colloquium numerical tasks Seminar Verbal knowledge testing					

Knowledge evaluation after semester	written and oral exams	
Student activities:	Aktivnost	ECTS
	(Written exam)	3
	(Oral exam)	2
Remark	This course can be used for final thesis theme	
Prerequisites:	No prerequisites.	

Code WEB/ISVU	23072/85204	ECTS	3.0		Academic year	2018/2019
Name	Business English for Computing					
Status	2nd semester - Undergraduate professional study in computing (Redovni raarstvo) - elective course					
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home					30+30 (30+0+0+0) 30
Teachers	Lectures:1. dr.sc. Biljana Stojaković ,prof.v.š. u trajnom zvanju Auditory exercises: Zoran Vulelija					
Course objectives	To develop students English language skills: oral and written business communication, presentation of oneself/company,					
Learning outcomes:	1.ability to analyse both the position and significance of the English language in business world. Level:6 2.to compare Croatian and English non-finite forms. Level:6,7 3.to identify various non-finite forms in English. Level:6 4.to integrate computing terminology into new contexts. Level:6,7 5.ability to generate a business letter, a business e-mail, an order, an invoice, etc. . Level:6,7 6.to make a difference between formal an informal email. Level:6 7.ability to relate the levels of ICT education in the English speaking countries and in Croatia. Level:6,7 8.ability to relate the occupations and jobs in the field of expertise in the English speaking countries and in Croatia. Level:6,7 9.ability to relate academic degrees in ICT education in the English speaking countries and in Croatia. Level:6,7 10.ability to distinguish between high and low quality of business correspondence in English. Level:6 11.ability to devise a presentation of a company in English. Level:6,7 12.to make a difference between various forms of word formation in English. Level:6 13.ability to analyse the most important features of a job interview. Level:6 14.ability to present the content related to the field of expertise in English. Level:6,7 15.ability to write a CV and a job application letter. Level:6,7 16.ability to analyse the differences between oral and written business communication (verbal/nonverbal; synchronous/asynchronous) . Level:6 17.to analyse various types of business correspondence. Level:6 18.to analyse phraseology in communication via phone. Level:6					
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Discussion Questions and answers Seminar, students presentation and discussion Homework presentation					
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Essay writing Discussion, brainstorming Interactive problem solving					
Course content lectures	1.Non-finite forms, 2h, Learning outcomes:2,14 2.Croatian and English non-finite forms, 2h, Learning outcomes:2,3,14 3.Business correspondence, 2h, Learning outcomes:1,9,14,16,17 4.Formal and informal email, 2h, Learning outcomes:6,10,14,16 5.Types of business letter, 2h, Learning outcomes:10,14,16,17 6.Job application letter, 2h, Learning outcomes:10,14,16,17 7.CV, 2h, Learning outcomes:10,14,16,17 8.Business offer, 2h, Learning outcomes:10,14,16,17 9.Preliminary exam, 2h, Learning outcomes:3,14,15 10.IT education levels in the world, 2h, Learning outcomes:7,8,9,14 11.Presenting a company, 2h, Learning outcomes:11,14 12.Phraseology in communicatin via phone, 2h, Learning outcomes:14,16,18 13.Job interview, 2h, Learning outcomes:13,14 14.Job interview, 2h, Learning outcomes:13,14 15.Preliminary exam, 2h, Learning outcomes:6,7,8,11,13,14,16,18					
Course content auditory	1.Operating systems; non-finite forms (introduction), 2h, Learning outcomes:2,3,4,14 2.Word processing; non-finite forms (exercises), 2h, Learning outcomes:2,3,4,14 3.Spreadsheet, database; vocabulary exercises, 2h, Learning outcomes:4,5,14 4.Internet and email; writing business email, 2h, Learning outcomes:4,5,6,9,14,15 5.The Web; word formation; writing a business letter (basics), 2h, Learning outcomes:4,5,7,14,15 6.Jobs in ICT; prefixation in IT terminology; applying for a job, 2h, Learning outcomes:3,4,7,14,15 7.Graphics and design; writing a CV, 2h, Learning outcomes:4,5,8,14,15 8.Dtp and multimedia; writing a business offer, 2h, Learning outcomes:4,5,9,14,15 9.Preliminary exam, 2h, Learning outcomes:4,14 10.Web design; word formation, 2h, Learning outcomes:4,11,14 11.Program design and computer languages; Java; prefixation in IT terminology, 2h, Learning outcomes:4,11,14 12.Internet security; suffixation in IT terminology, 2h, Learning outcomes:4,11,14 13.Computer networks; compunding in IT terminology, 2h, Learning outcomes:4,11,14 14.New technologies; vocabulary exercises, 2h, Learning outcomes:4,11,14 15.Preliminary exam, 2h, Learning outcomes:4,11,14					

Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment Operating supplies
Exam literature	Basic literature: 1. E.M.Fabre, S.R.Esteras, Professional English in Use ICT 2. materijali s predavanja (objavljeni na web stranicama kolegija) sastavljeni od tekstova preuzetih iz suvremene stručne i metodičke literature 3. Ashley, A.A. Handbook of Commercial Correspondence. OUP, 2000
Students obligations	Regular attendance in both lectures and exercises (maximum of 3 absences from exercises are tolerated)
Knowledge evaluation during semester	2 preliminary exams in both lectures and exercises
Knowledge evaluation after semester	Written and oral exam
Student activities:	Aktivnost ECTS (Written exam) 3
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22849;
Proposal made by	Professor Biljana Stojaković, PhD

Code WEB/ISVU	23073/85205	ECTS	3.0	Academic year	2018/2019
Name	Business German for computing				
Status	2nd semester - Undergraduate professional study in computing (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (30+0+0+0) 30	
Teachers	Lectures:2. Doc. dr. sc. Lidija Tepeš Golubić v. pred. Auditory exercises: Doc. dr. sc. Lidija Tepeš Golubić v. pred.				
Course objectives	To develop students language skills, use basic business terminology				
Learning outcomes:	1.ability to formulate a CV and a job application letter in English. Level:6,7 2.ability to analyse texts related to the field of expertise and check the predefined theses in order to motivate students to take a critical attitude toward the texts. Level:6 3.ability to give a presentation in German. Level:6,7 4.abilityto write a summary and a report of a text . Level:6,7 5.ability to write a business letter, an application, etc. . Level:6,7 6.ability to give a task based presentation in German. Level:6,7 7.ability to develop language skills in business communication; to use basic business terminology. Level:6,7 8.ability to combine the acquired knowledge with the English language in computing. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Discussion Questions and answers Seminar, students presentation and discussion Homework presentation Other				
Methods of carrying out auditory exercises	Group problem solving Interactive problem solving Other				
Course content lectures	1.Introductory lecture, 2h, Learning outcomes:7 2.Texts related to the field of expertise understanding and analysis, 2h, Learning outcomes:2,4,7,8 3.Texts related to the field of expertise understanding and analysis, 2h, Learning outcomes:2,4,7,8 4.German grammar 1, 2h, Learning outcomes:2,4,7,8 5.Job application letter, 2h, Learning outcomes:5,6,7,8 6.Job interview, 2h, Learning outcomes:5,6,7,8 7.Colloquium 1, 2h, Learning outcomes:1,2,3,4,5,6,7,8 8.Creating a PowerPoint Presentation, 2h, Learning outcomes:3,6,7,8 9.Task based presentation in German, 2h, Learning outcomes:3,6,7,8 10.Task based presentation in German, 2h, Learning outcomes:3,6,7,8 11.German grammar 2, 2h, Learning outcomes:2,4,7,8 12.Jobs of the future, 2h, Learning outcomes:2,7,8 13.English loanwords in German language, 2h, Learning outcomes:2,7,8 14.Future for the Computer technology, 2h, Learning outcomes:2,7,8 15.Colloquium 2, 2h, Learning outcomes:1,2,3,4,5,6,7,8				
Course content auditory	1.Introductory lecture, 2h, Learning outcomes:7 2.Texts related to the field of expertise understanding and analysis, 2h, Learning outcomes:2,4,7,8 3.Texts related to the field of expertise understanding and analysis, 2h, Learning outcomes:2,4,7,8 4.A Review of German Grammar 1, 2h, Learning outcomes:2,4,7,8 5.Job application letter, 2h, Learning outcomes:5,6,7,8 6.Job interview, 2h, Learning outcomes:5,6,7,8 7.Colloquium 1, 2h, Learning outcomes:1,2,3,4,5,6,7,8 8.Creating a PowerPoint Presentation, 2h, Learning outcomes:3,6,7,8 9.Task based presentation in German, 2h, Learning outcomes:3,6,7,8 10.Task based presentation in German, 2h, Learning outcomes:3,6,7,8 11.German grammar 2, 2h, Learning outcomes:2,4,7,8 12.Jobs of the future, 2h, Learning outcomes:2,7,8 13.English loanwords in German language, 2h, Learning outcomes:2,7,8 14.Future for the Computer technology, 2h, Learning outcomes:2,7,8 15.Colloquium 2, 2h, Learning outcomes:1,2,3,4,5,6,7,8				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Operating supplies				
Exam literature	Basic literature: 1. Marčetić, T.: Pregled gramatike njemačkoga jezika, Školska knjiga, Zagreb 2. Hansen-Kokoruš R., Matešić J., Pečur-Medinger Z., Znika M.: Njemačko-hrvatski univerzalni rječnik, Zagreb, 2005. 3. izbor tekstova objavljen na web stranicama kolegija, tekstovi preuzeti iz suvremene stručne literature, časopisa i Interneta				
Students obligations	Attending classes and participation in the processs				
Knowledge evaluation during	Preliminary exam, seminar paper				

semester	
Knowledge evaluation after semester	Written and/or oral exam
Student activities:	Aktivnost ECTS (Activity in class) 1 (Written exam) 1 (Seminar Work) 1
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	24375;
Proposal made by	Phd. Lidija Tepeš Golubić, senior lecturer, 11th of March 2014

Code WEB/ISVU	23524/156276	ECTS	4.0	Academic year	2018/2019
Name	Communication Skills				
Status	4th semester - Software engineering (Redovni raarstvo) - elective course4th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 60	
Teachers	Lectures:Pred. Ida Popčević prof. Laboratory exercises:Pred. Ida Popčević prof.				
Course objectives	To promote humanistic values such as mutual responsibility, the rights to being included and accepted, to freedom of speech, tolerating the different.				
Learning outcomes:	1.ability to formulate the basics of successful communication. Level:6,7 2.ability to identify obstacles to successful communication, understanding conflicts, the basic features of group processes and rules of public presentation. Level:6 3.ability to classify techniques and skills needed for successful communication with individuals, in groups and in front of audience. Level:6,7 4.ability to devise clear expressing and active listening; to provide feedback with respect. Level:6,7 5.ability to solve communication issues and conflicts. Level:6 6.ability to present various business plans, problems and solutions. Level:6,7 7.ability to estimate the influence of gender based attitudes on work with persons of the same or opposite gender. Level:6,7 8.ability to compare the intercultural differences for better communication with people belonging to various cultures. Level:6,7 9.ability to form a leader roles and functions directed towards social and emotional relations between members of a group and performance of individual and group goals. Level:6 10.ability to develop humanistic values, such as mutual responsibility, the rights to inclusion and to being accepted, expressing ideas freely, tolerance of the different. 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				
Methods of carrying out laboratory exercises	Group problem solving Discussion, brainstorming Interactive problem solving Workshop				
Course content lectures	1.Communication process (1). , 2h, Learning outcomes:1 2.Communication process (2)., 2h, Learning outcomes:1,3 3.Verbal Communication., 2h, Learning outcomes:2,3,4 4.Non-verbal Communication., 2h, Learning outcomes:2,3 5.Foundations of feminism., 2h, Learning outcomes:7,8 6.The influence of gender based opinions on work with persons of the same or the opposite gender., 2h, Learning outcomes:7,8 7.Foundations of multiculturalism. , 2h, Learning outcomes:7,8 8.Intercultural differences more successful communication with people from other cultures. , 2h, Learning outcomes:6,7 9.Negative and positive aspects of conflict., 2h, Learning outcomes:3,4,5 10.Constructive and destructive interaction and communication. , 2h, Learning outcomes:3,4,5 11.Communication in small groups., 2h, Learning outcomes:3,4,5 12.Communication in large groups., 2h, Learning outcomes:3,4,5 13.Group structure and process specificities. , 2h, Learning outcomes:3,4,5 14.Public presentation (1)., 2h, Learning outcomes:3,4,5 15.Public presentation (2)., 2h, Learning outcomes:3,4,5,8				
Course content laboratory	1.Introduction., 2h, Learning outcomes:2,3,4,5,6 2.Non-verbal communication., 2h, Learning outcomes:2,3,4,5,6 3.Advanced non-verbal communication. , 2h, Learning outcomes:2,3,4,5,6 4.Improvising. , 2h, Learning outcomes:2,3,4,5,6 5. Advanced improvising. , 2h, Learning outcomes:2,3,4,5,6 6.Improvising a discussion., 2h, Learning outcomes:2,3,4,5,6 7.Discussion prepared in advance., 2h, Learning outcomes:2,3,4,5,6 8.Karl Popper debate. , 2h, Learning outcomes:2,3,4,5,6 9.Karl Popper with a plan debate., 2h, Learning outcomes:2,3,4,5,6 10.World Schools debate. , 2h, Learning outcomes:2,3,4,5,6 11.British Parliament debate. , 2h, Learning outcomes:2,3,4,5 12.Individual debate. , 2h, Learning outcomes:2,3,4,5,6,7 13.Group exercises. , 2h, Learning outcomes:1,2,3,4,5,6,7,8 14.Group exercises. , 2h, Learning outcomes:1,2,3,4,5,6,7 15.Group exercises. , 2h, Learning outcomes:1,2,3,4,5,6,7				
Required materials	Basic: classroom, blackboard, chalk... Overhead projector Chairs and tables may not be fixed to the floor.				

Exam literature	Basic literature: 1. J.C. Pearson, B.H. Spitzberg: Interpersonal communication: concepts, components and contexts. Dubuque: Wm. C. Brown Publishers, 1990 2. R. Bolton: People skills. New York: Touchstone, 1986 3. J.I. Van Emden, L. Becker: Presentation skills for students. London: Palgrave Macmillan, 2004 Additional literature: 1. J. Stewart (Ed.): Bridges, not walls: a book about interpersonal communication. McGraw-Hill, 1999 2. A. Holliday, M.I. Hyde, J. Kullman: Intercultural communication. London: Routledge, 2004 3. S.E. Lucas: The art of public speaking. New York: McGraw-Hill, 1998
Students obligations	Maximum of 3 absences from exercises.
Knowledge evaluation during semester	Regular attendance#10#10#50$Exam, theoretical issues#3#90#50$
Knowledge evaluation after semester	Oral exam
Student activities:	Aktivnost ECTS (Classes attendance) 1 (Written exam) 1 (Written exam) 2
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.

Code WEB/ISVU	23370/154959	ECTS	5.0		Academic year	2018/2019
Name	Computer Applications					
Status	1st semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course					
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home					30+30 (0+30+0+0) 90
Teachers	Lectures:1. Danijela Pongrac , prof. Laboratory exercises:prof. Marta Alić Laboratory exercises: Danijela Pongrac , prof.					
Course objectives	To introduce students to information technology and its business application; to teach students how to work on a PC of a standard configuration					
Learning outcomes:	1.identify subsystems of organizational IS. Level:6 2.ability to distinguish between desktop PCs, laptops, tablet PCs, in regard with typical users. Level:6 3.ability to make a proposal of basic computer configuration (CPU, memory, hard disk, input and output devices). Level:6,7 4.ability to understand the difference between operational and supporting information systems. Level:6 5.ability to relate the type and the goal of an information system to the function of an organisation system. Level:6,7 6.identify sets of key data base for organizational IS. Level:6 7.ability to distinguish between different models of organisation and different types of networks intended for business . Level:6 8.ability to distinguish between the Internet, intranet and extranet. Level:6 9.ability to identify the threats related to the abuse of both the information technologies and distant data transfer. Level:6 10.ability to prepare a workplace taking into account the computer working environment by using a safety and health protection rule book . Level:6,7 11.ability to manage information systems by means of Windows and an e-mail account. Level:6,7 12.ability to write a Word document by using instructions for editing and inserting objects and references (tables of content and pictures), collaboration, mail merge, macroinstructions. Level:6,7 13.ability to create an Excel document by using the instructions for editing cells/worksheet, inserting and designing functions (basic and nested), filtering, inserting pivot tables and graphs, macroinstructions . Level:6,7 14.ability to prepare a ppt presentation by using master slide, animation, object insertion, transfer from one to another ppt presentation. Level:6,7					
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Simulations Discussion Questions and answers Seminar, students presentation and discussion					
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Group problem solving					
Course content lectures	1.introduction to the subject, the rights and obligations of students, monitoring progress and assessment, 2h 2.Introduction to IS, the information system in the business. Definition of the system, the business system and its information system, 2h, Learning outcomes:1 3.Dataware - structure, components, administration, data model, 2h, Learning outcomes:7,8 4.Netware - Internet technology and its application, 2h, Learning outcomes:6 5.Netware- The development of the Internet and its use of Intranet and Extranet, 2h, Learning outcomes:6 6.Cloud computing, 2h, Learning outcomes:5 7.Colloquium- the first theoretical part, 2h, Learning outcomes:1,6,7,8 8.Hardware - basic computer parts, 2h, Learning outcomes:2 9.Hardware - basic computer parts, development in the last five years, 2h, Learning outcomes:2,3 10.Software - The types and kinds of IS, 2h, Learning outcomes:4,5 11.Lifeware - Ergonomics jobs with computers, organizational knowledge, 2h, Learning outcomes:7,8 12.Orgware - IS protection and safety, 2h, Learning outcomes:9,10 13.Orgware - privacy policy, 2h, Learning outcomes:9,10 14.Colloquium - the second theoretical part, 2h, Learning outcomes:2,3,4,5,8,9,10 15.correction Colloquium first or second, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10					
Course content laboratory	1.Introduction to work, exploring computer equipment, 2h 2.Office 365, OneDrive, 2h, Learning outcomes:11 3.WORD - word processing, working with documents, registration, tagging and editing text, formatting text and paragraphs, working with images, preparation for printing, mail merge, save the document in a different format, 2h, Learning outcomes:11,12 4.WORD - style text and headings, numbering, wrapp, footnotes, page numbering, table of contents, bookmarks and cross-references, tabs, home page, 2h, Learning outcomes:11,12 5.WORD - working with tables, pictures, mathematical expressions, graphical representation of data, 2h, Learning outcomes:11,12 6.WORD - Macros, creating and filling out a form, document protection, 2h, Learning outcomes:11,12 7.Colloquium, 2h, Learning outcomes:11,12 8.correction colloquium, 2h, Learning outcomes:11,12 9.EXCEL-spreadsheet, data entry and data types, formulas, operators, cell references, comments, worksheets, 2h, Learning outcomes:11,13 10.EXCEL-table formatting, functions count, if, lookup, date and other, graphics, 2h, Learning outcomes:11,13 11.EXCEL-operation with the data, grouping, filtering, sorting, pivot table, 2h, Learning outcomes:11,13					

12.EXCEL - conditional formatting, goal seek, data tables one and two variables, scenario, macro and document protection, 2h, Learning outcomes:11,13
13.Colloquium, 2h, Learning outcomes:11,13
14.correction colloquium, 2h, Learning outcomes:11,13
15.Presentations, select a theme, input elements, making the Master slide, animation, 2h, Learning outcomes:14

Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Overhead projector Operating supplies Paper, pencil
Exam literature	Basic literature: Materijali s predavanja i vježbi dostupni na LMS-u. Šimović, Maletić, Afrić: Osnove informatike, Zagreb 2010. Additional literature: K.C.Laudon, J.P.Laudon: Essentials of Management Information Systems, 12th edition, Pearson Education, England, 2017. D. Grundler, Kako radi računalo, PRO-MIL, Varaždin, 2004. D. Grundler, D. Franulić Šarić, T. Rolich, Primijenjeno računalstvo - Izabrani primjeri, Graphis, Zagreb, 2002.
Students obligations	maximum of 2 absences from exercises
Knowledge evaluation during semester	1. Check preperation for exercise 20% marks Points rating 0-9 Good 10-14 Good 15-19 Very good 20-24 Great 2. Colloquium theory, first part, 20% of the grade, outcomes 1,2,3,4,5 Number of points Rating 14-15 excellent 12-13 very good 10-11 good 8-9 is sufficient 0-7 inadequate 3. Colloquium theory, second part, 20% of the grade, outcomes 6,7,8,9,10 Number of points Rating 14-15 excellent 12-13 very good 10-11 good 8-9 is sufficient 0-7 inadequate 4. Colloquium WORD (75% for passage), 20% of the grade. Outcomes 11:12 Points rating 95-100 excellent 89-94 very good 82-88 good 75-81 sufficient 0-74 inadequate 5. Colloquium EXCEL (75% for passage), 20% of the grade. outcomes 13 Points rating 95-100 excellent 89-94 very good 82-88 good 75-81 sufficient 0-74 inadequate
Knowledge evaluation after semester	First test preparation for exercise 20% marks Points rating 0-9 is sufficient 10-14 good 15-19 very good 20-24 excellent Second The theory written examination, 40% marks, outcomes 1,2,3,4,5,6,7,8,9,10 Number of points Rating 28-30 excellent 23-27 very good 19-22 good 15-18 sufficient 0-14 inadequate 3rd WORD (75% for passage), 20% of the grade. outcomes 11.12 Points rating 95-100 excellent

89-94 very good
82-88 good
75-81 sufficient
0-74 inadequate

4th EXCEL (75% for passage), 20% of the grade. outcomes 13
Points rating
95-100 excellent
89-94 very good
82-88 good
75-81 sufficient
0-74 inadequate

Student activities:	Aktivnost	ECTS
	(Written exam)	5
Remark	This course can be used for final thesis theme	
Prerequisites:	No prerequisites.	
ISVU equivalents:	22744;	
Proposal made by	Vesna Alić-Kostešić dipl.ing.stroj., 9.5.2015	

Code WEB/ISVU	23367/154954	ECTS	7.0	Academic year	2018/2019
Name	Computer Architecture				
Status	3rd semester - Software engineering (Redovni raarstvo) - obligatory course3rd semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+45 (30+15+0+0) 135	
Teachers	Lectures:1. dr.sc.rač. Ivica Dodig , prof.v.š. Lectures:2. dr.sc.rač. Davor Cafuta , prof.v.šk. Auditory exercises: Jelena Kapelac Laboratory exercises: Jelena Kapelac				
Course objectives	To introduce students to the structure of complex algorithms and logical components (bistables, registers and counters) composed of elementary logic circuits;				
Learning outcomes:	1.ability to create a combination set according to predefined specifications. Level:6,7 2.ability to design a combination logical set based on a current state table and vice versa. Level:6,7 3.ability to calculate a minimized form of a logical circuit by means of both algebraic and Karnaugh methods. Level:6 4.ability to control Logisim program for simulation and testing by means of logical circuits. Level:6,7 5.ability to redesign logical functions so that they use NI or NILI circuits only. Level:6,7 6.ability to design a counter or a clock-controlled shift register based on bistables. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Modelling				
Methods of carrying out auditory exercises	Group problem solving Computer simulations				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations				
Course content lectures	1.Boolean functions and algebra, 3h, Learning outcomes:5 2.The conversion logic circuits in the form using only NAND and NOR gates, 3h 3.Minimization of logic functions, 3h, Learning outcomes:5 4.Combination circuits, 3h, Learning outcomes:1,4 5.Flip-flops, 3h 6.Von Neumann model of computer architecture, 2h 7.Atmel AVR computer architecture, 3h 8.AVR microcontroller programming, 3h, Learning outcomes:5,6 9.AVR computer architecture commands, 5h, Learning outcomes:4,5 10.Assembler program examples, 2h, Learning outcomes:2 11.AVR directives and operators, 3h, Learning outcomes:2 12.C - Assembler relation, 2h, Learning outcomes:3 13.Input-output data transfer, 3h, Learning outcomes:3 14.Memory hierarchy, 3h, Learning outcomes:6 15.Virtual memory, 3h, Learning outcomes:6				
Course content auditory	1.No classes, 1h 2.Boolean algebra, logical functions and circuit, 1h, Learning outcomes:4 3.Conversion of functions into the NI or NILI form, 1h, Learning outcomes:4,5 4.Minimizing logical functions, 1h, Learning outcomes:5 5.First partial exam, 1h, Learning outcomes:4,5 6.Combination circuits, 1h, Learning outcomes:1,4 7.Flip-flops, 1h, Learning outcomes:3,4 8.Simple assembler programs, 1h, Learning outcomes:2 9.Second partial exam, 1h, Learning outcomes:1,2,4 10.Complex assembler programs, 1h, Learning outcomes:2 11.Subroutines and macro instructions, 1h, Learning outcomes:2,3 12.Operations with memory, 1h, Learning outcomes:2,3 13.Interruption system, 1h, Learning outcomes:2,3 14.No classes, 1h, Learning outcomes:4 15.Final Exam, 1h, Learning outcomes:2,3				
Course content laboratory	1.No classes, 2h 2.No classes, 2h 3.Boolean algebra, logical functions and circuit, 2h, Learning outcomes:4 4.Conversion of functions into the NI or NILI form, 2h 5.Minimizing logical functions, 2h, Learning outcomes:5 6.Combination circuits, 2h, Learning outcomes:1,4 7.Flip-flops, 2h 8.Compensation of missed exercises, 2h, Learning outcomes:1,4,5 9.No classes, 2h 10.Simple assembler programs, 2h, Learning outcomes:2 11.Complex assembler programs, 2h, Learning outcomes:2 12.Subroutines and macro instructions, 2h, Learning outcomes:2 13.Operations with memory, 2h, Learning outcomes:2 14.Interruption system, 2h, Learning outcomes:2				

	15.Compensation of missed exercises, 2h, Learning outcomes:2
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Overhead projector
Exam literature	Basic literature: S. Ribarić, Arhitektura mikroprocesora, Tehnicka knjiga, Zagreb, 1990. U. Peruško, Digitalna elektronika, Školska knjiga Zagreb, 1993. John L. Hennessy, David A. Patterson, Computer Architecture: A Quantitive Approach; Fifth Edition, Morgan Kaufmann, 2011. AVR ATmega128 Instruction Set Dodatna: S. Ribarić, Arhitektura racunala RISC i CISC, Školska knjiga, Zagreb, 1996. S. Ribarić, Naprednije arhitekture mikroprocesora, Element, Zagreb, 1997. L. Budin, Mikroracunala i mikroupravljaci, Element, Zagreb, 1997. Marko Čupić: Zbirka riješenih zadataka iz Digitalne elektronike i Digitalne logike, Zagreb, 2005. Myke Predko: Digital Electronics Demystified, McGraw Hill, 2006. Gnter Schmitt: Mikrocomputertechnik mit Controllern der Atmel AVR-RISC-Familie, Oldenbourg Verlag Mnchen, 2010.
Students obligations	Solving ten laboratory exercices.
Knowledge evaluation during semester	Ten laboratory exams - 6 points each Two partial exams - 10 points each Final exam - 20 points Optional points for additional effort Every partial exam has a correctional exam Maximum 100 points 0-49 - not good enough 50-61 - sufficient 62-74 - good 75-86 - very good 87-100 - excellent
Knowledge evaluation after semester	Written exam is evalued with 40 points, and remaining 60 points are transferred from the achievement on laboratory exams during the semester time.
Student activities:	Aktivnost ECTS (Written exam) 7
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22734;142128;
Proposal made by	Jelena Kapelac

Code WEB/ISVU	23359/148934	ECTS	5.0	Academic year	2018/2019
Name	Computer Games Development				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 90	
Teachers	Lectures: Tin Kramberger struč. spec. ing. techn. inf., pred. Laboratory exercises: Renata Kramberger				
Course objectives	Mastering the techniques of development of computer games.				
Learning outcomes:	1.IDE for game development. . Level:6,7 2.Establish (similarity / difference) between conventional programming and programming computer games.. Level:6 3.Physics and mathematics for game development. . Level:6 4.Plan development of computer games.. Level:6,7 5. Design computer game surroundings.. Level:6 6.Animate objects and surroundings with computer game programming framework. Level:6,7 7.Integrate artifitial inteligence with objects.. Level:6,7 8.Create computer game by the book.. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Modelling Discussion Questions and answers Homework presentation				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Group problem solving Data mining and knowledge discovery on the Web Discussion, brainstorming Computer simulations Workshop				
Course content lectures	1.Basics of computer games, 2h, Learning outcomes:1,2,4 2.2D graphics and physics, 2h, Learning outcomes:2,3 3.User interface and game flow management, 2h, Learning outcomes:1,2,4,5 4.3D object basics, 2h, Learning outcomes:1,2,3,4,5 5.3D object modeling and animations, 2h, Learning outcomes:5,6 6.Illumination, shadows and cameras, 2h, Learning outcomes:5 7.Animations in a 3D environment, 2h, Learning outcomes:6 8.Colloquium, 2h, Learning outcomes:1,2,3,4,5,6 9.Particle systems and audio, 2h, Learning outcomes:2,4,5,6 10.Artificial intelligence in game development, 2h, Learning outcomes:2,6,7 11.Alternative platforms for the development of computer games, 2h, Learning outcomes:4,8 12.Multiplayer game development, 2h, Learning outcomes:2,4,8 13.Guest lecturer, 2h, Learning outcomes:8 14.Student project presentation, 2h, Learning outcomes:1,2,3,4,5,6,7,8 15.Student project presentation, 2h, Learning outcomes:1,2,3,4,5,6,7,8				
Course content laboratory	1.No classes, 2h 2.Introduction to Object Oriented Programming, 2h, Learning outcomes:1,2 3.Getting to know the development tool, introduction to 2D game development, 2h, Learning outcomes:1,2 4.2D graphics and physics, 2h, Learning outcomes:2,3 5.Games textures and surroundings, 2h, Learning outcomes:1,2,4,5 6.Getting to know 3D game development, 2h, Learning outcomes:2,3,5 7.3D object modeling, 2h, Learning outcomes:5 8.Colloquium, 2h, Learning outcomes:1,2,3,4,5,6 9.3D object animation, 2h, Learning outcomes:5,6 10.3D animations and avatars, 2h, Learning outcomes:5,6 11.Setting up 3D Scene, 2h, Learning outcomes:4,5 12.Particle systems and audio, 2h, Learning outcomes:2,4,5,6 13.Artificial intelligence, 2h, Learning outcomes:7 14.Multiplayer game development, 2h, Learning outcomes:2,4,8 15.Colloquium, 2h, Learning outcomes:1,2,3,4,5,6,7,8				
Required materials	General purpose computer laboratory Whiteboard with markers Overhead projector				
Exam literature	Lauren S. Ferro: Gamification with Unity 5.x, Packt Publishing, 2016. Dr. Edward Lavieri: Getting Started with Unity 5, Packt Publishing, 2015. Patrick Felicia: Getting Started with Unity, Packt Publishing, 2013. Claudio Scolastici: Unity 2D Game Development Cookbook, Packt Publishing, 2015				
Students obligations	Attendance at 70% of laboratory exercises, submission of the practical project.				

Knowledge evaluation during semester	The theoretical part of the learning outcomes, max. 20 points 2 colloquiums, 10 points each. For passage, it is necessary to collect> 5 points. Practical part of the learning outcomes max 80% of the points: Exercises, max. 40 points. The preparation, commitment, content and appearance of the project that is given for the exercise are evaluated. Colloquium exercises: individual reports, a condition for a positive grade. Practical work, max 40 points. Total, max. 100 points. 91 - 100 = 5 78 - 90 = 4 64 - 77 = 3 51 - 63 = 2 50 and under, under-achievement
Knowledge evaluation after semester	Total = Written exam + points during the semester of labs Total, max. 100 points. 91 - 100 = 5 78 - 90 = 4 64 - 77 = 3 51 - 63 = 2 50 and under, under-achievement
Student activities:	Aktivnost ECTS (Written exam) 5
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Programiranje
Proposal made by	Tin Kramberger , 02.06.2017.

Code WEB/ISVU	23373/154963	ECTS	6.0	Academic year	2018/2019
Name	Computer Networks				
Status	4th semester - Software engineering (Redovni raarstvo) - obligatory course4th semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 120	
Teachers	Lectures:1. Dunja Bjelobrk Knežević dipl.ing Lectures: Nikolina Kasunić struč.spec.ing.techn.inf. Laboratory exercises: Dunja Bjelobrk Knežević dipl.ing Laboratory exercises: Nikolina Kasunić struč.spec.ing.techn.inf.				
Course objectives	To transfer to students the knowledge related to basic principles of a computer network, physical layer, data layer, network layer and transport layer; to introduce students to problems related to internetworking and routing; to qualify students to set up a small-sized to medium-sized computer network				
Learning outcomes:	1.ability to analyse the way today's computer networks function. Level:6 2.to decompose computer communications into layers. Level:6 3.to identify computer networks functional elements and equipments. Level:6 4.ability to design a solution of small-sized to a medium-sized computer network. Level:6 5.ability to test the functionality of a small-sized to a medium-sized computer network. Level:6 6.to evaluate the computer network security. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Discussion				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Mind mapping Workshop				
Course content lectures	1.Introduction to Communications and Computer Networks, 2h, Learning outcomes:1 2.Computer Networks Architecture - Reference Models, 2h, Learning outcomes:1 3.TCP/IP Networking Principles, 2h, Learning outcomes:1 4.Networking Media an Protocols, 2h, Learning outcomes:1 5.Physical Layer, 2h, Learning outcomes:1 6.Data Link Layer, 2h, Learning outcomes:1 7.Network Layer and IPv4 addressing, 2h, Learning outcomes:1 8.Transport Layer, 2h, Learning outcomes:2,3 9.Routing, 2h, Learning outcomes:1 10.Application Layer and Network Applications, 2h, Learning outcomes:1 11.Generic Cabling, 2h, Learning outcomes:1 12.Wireless Networks, 2h, Learning outcomes:1 13.LAN MAN WAN networking, 2h, Learning outcomes:1 14.Service Oriented Networks, 2h, Learning outcomes:1,2 15.Computer Networks Security, 2h, Learning outcomes:1				
Course content laboratory	1.Network Tools, MAC and IP Address Usage, 2h, Learning outcomes:1,4,5 2.Network Tools, ARP Protocol, 2h, Learning outcomes:1,4,5 3.Network Tools, Network Protocol Analizer, 2h, Learning outcomes:1,4,5 4.IPv4 Addressing, 2h, Learning outcomes:1,4 5.IPv4 Subnetting - VLSM, 2h, Learning outcomes:1,4,5 6.Subnetting and LAN Configuration, 2h, Learning outcomes:1,4 7.Basic Router Configuration, 2h, Learning outcomes:2,4 8.Static Routing, 2h, Learning outcomes:1,2,4 9.WLAN Configuration, 2h, Learning outcomes:1,3,4 10.Dynamic Routing Protocols, RIP Protocol, 2h, Learning outcomes:3,4,5 11.Configuring DHCP on a Router, 2h, Learning outcomes:2,3,4 12.Hands-On Lab, 2h, Learning outcomes:2,3,4 13.Hands-On Lab, 2h, Learning outcomes:2,3,4 14.Generic Cabling, 2h, Learning outcomes:1,5 15.Final Exam, 2h, Learning outcomes:2,3,4				
Required materials	Special purpose laboratory Special purpose computer laboratory Whiteboard with markers Overhead projector Maquette Tools				
Exam literature	Basic literature: 1. A.S. Tanenbaum, David J. Wetherall: Computer Networks (5th Edition), Prentice Hill, October 7, 2010, ISBN-10: 0132126958 Additional literature: 2. James F. Kurose, Keith W. Ross: Computer Networking: A Top-Down Approach (6th Edition) 2012 ISBN-10: 0132856204 ISBN-13: 978-0132856201				

Students obligations	Lectures regular attendance (max. 2 absence) Labs regular attendance (max. 2 absence)
Knowledge evaluation during semester	Preliminary exam 1. teoretical test 1st part Preliminary exam 2. practical exam Preliminary exam 3. teoretical test 2nd part
Knowledge evaluation after semester	written and oral exams
Student activities:	Aktivnost ECTS (Written exam) 5 (Written exam) 1
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22715;171887;

Code WEB/ISVU	23365/154946	ECTS	5.0	Academic year	2018/2019
Name	Computer Networks Administration				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			15+45 (0+45+0+0) 90	
Teachers	Lectures:1. Dunja Bjelobrk Knežević dipl.ing Laboratory exercises: Dunja Bjelobrk Knežević dipl.ing Laboratory exercises: Nikolina Kasunić struč.spec.ing.techn.inf.				
Course objectives	Learning of computer networks management and administration				
Learning outcomes:	1.identification of computer networks management and administration tasks. Level:6 2.ability to test the proper operation of devices in a computer network. Level:6 3.medium complex computer network design. Level:6 4.ability to control a small-sized to medium-sized computer network. Level:6,7 5.ability to detect the causes of malfunctions in a small-sized to medium-sized computer network. Level:6 6.defining of computer network security elements. Level:7 7.data centre reliability requierements. Level:6,7 8.evaluation of computer networks outsourcing needs. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Simulations Seminar, students presentation and discussion referral visit				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Group problem solving Other Data center visit				
Course content lectures	1.Introduction to network management (1), 1h, Learning outcomes:1 2.Uvod u upravljanje mreama (2), 1h, Learning outcomes:2 3.Network Management basic tools, 1h, Learning outcomes:2 4.Modern networking equipment, 1h, Learning outcomes:3 5.Contemporary computer network design, 1h, Learning outcomes:3 6.Generic cabling systems, 1h, Learning outcomes:3 7.Wireless computer networks, 1h, Learning outcomes:3 8.OSI network management model, 1h, Learning outcomes:4 9.SNMP network management, 1h, Learning outcomes:5 10.Network traffic management, 1h, Learning outcomes:5 11.Networking security - firewall, NAT, 1h, Learning outcomes:5 12.Intrusion detection systems, 1h, Learning outcomes:5 13.Computer networks administration, 1h, Learning outcomes:6 14.Outsourcing in computer networks, 1h, Learning outcomes:8 15.Data center management, 1h, Learning outcomes:7				
Course content laboratory	1.Basic Router Configuration, RIP Protocol, Static Routing, 3h, Learning outcomes:2,5 2.Dynamic Routing Protocols, OSPF Protocol, 3h, Learning outcomes:2,5 3.Access Lists, 3h, Learning outcomes:2,4,5,6 4.Switching, VLAN, Switch Port Securty, 3h, Learning outcomes:2,4,5 5.Inter-VLAN Routing, 3h, Learning outcomes:2,3,4,5 6.Multilayer Switching, 3h, Learning outcomes:2,3,4,5 7.Generic Cabling, 3h, Learning outcomes:2,5 8.Encapsulation and authentication, 3h, Learning outcomes:2,3,4,5,6 9.Network Documenting, 3h, Learning outcomes:2,6 10.Port-mirroring, Network Protocol Analyzer, 3h, Learning outcomes:2,4,5,6 11.SNMP Protocol, Network Monitoring Tools, 3h, Learning outcomes:4,5,6 12.IPv6 addressing, 3h, Learning outcomes:1,3 13.Visit to Data Center, 3h, Learning outcomes:5,6 14.Network design, 3h, Learning outcomes:1,3,6,8 15.Final Exam, 3h, Learning outcomes:2,3,4,5,6				
Required materials	General purpose computer laboratory Special purpose computer laboratory Whiteboard with markers Overhead projector Tools Special equipment				
Exam literature	Basic literature: 1. M. Burges: Principles of Network and System Administration, John Wiley and Sons, 2002 2. Greg Shields The Shortcut Guide To Network Management for the Midmarket' Realtimepublishers.com, e-knjiga, izdanje 2007 Additional literature: 1. Internetworking Technologies Handbook, Handbook By Cisco Chapter 56: Simple Network Management Protocol, Publisher: Cisco Press; 4 edition 2003 2. C. Hunt: TCP/IP Network Administration, OReilly, 2002				

Students obligations	Regular lecture attendance (maximum of 2 absences from lectures)
	Regular exercise attendance (maximum of 2 absences from exercises)
Knowledge evaluation during semester	Preliminary exam No 1: teoretical exam part 1
	Preliminary exam No 2: practical exam: computer network configuration
	Preliminary exam No 3: teoretical exam part 2
Knowledge evaluation after semester	written and oral exams
Student activities:	Aktivnost ECTS
	(Written exam) 5
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Računalne mreže
ISVU equivalents:	22654;200101;
Proposal made by	May 25 2015

Code WEB/ISVU	24059/194673	ECTS	5.0	Academic year	2018/2019
Name	Computing system security				
Status	4th semester - Software engineering (Redovni raarstvo) - obligatory course4th semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home				30+30 (0+30+0+0) 90
Teachers	Lectures:1. dr.sc.rač. Davor Cafuta , prof.v.šk. Lectures:2. Tin Kramberger struč. spec. ing. techn. inf., pred. Lectures:3. dr.sc.rač. Ivica Dodig , prof.v.š. Lectures:4. Ivan Cesar mag. ing. Lectures:5. Ognjen Mitrović struč. spec. ing. techn. inf., pred. Laboratory exercises:dr.sc.rač. Davor Cafuta , prof.v.šk. Laboratory exercises: Ivan Cesar mag. ing. Laboratory exercises:dr.sc.rač. Ivica Dodig , prof.v.š. Laboratory exercises: Tin Kramberger struč. spec. ing. techn. inf., pred.				
Course objectives	The student is introduced to the modern concepts of computer security in software solutions and computer networks				
Learning outcomes:	1.Ability to formulate threats to computer security. Level:6,7 2.ability to generalize features of individual participants in the concept of computer security. Level:6,7 3.ability to clasify network threats and threats when creating software solutions. Level:6,7 4.ability to comment todays concepts of computer security in software solutions and computer systems. Level:6 5.ability to reconsider solutions for computer system protection in the program and network concept. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Discussion Questions and answers				
Methods of carrying out laboratory exercises	Workshop				
Course content lectures	1.Introduction to computer security, 2h, Learning outcomes:1,2,3 2.Cyber crime, 2h, Learning outcomes:2,3 3.Social Engineering, 2h, Learning outcomes:4,5 4.Cycle of hackers, 2h, Learning outcomes:2,3 5.Network attacks, 2h, Learning outcomes:1,2 6.IOT security, 2h, Learning outcomes:1,2,3 7.Buffer overflow attack, 2h, Learning outcomes:3,4,5 8.Malicious programs, 2h, Learning outcomes:3,4,5 9.Cryptography, 2h, Learning outcomes:1,2,4 10.Windows Active Directory Security, 2h, Learning outcomes:1,2 11.Mobile Application Security, 2h, Learning outcomes:2,3,4 12.Database system security, 2h, Learning outcomes:3,4,5 13.Application Security, 2h, Learning outcomes:4,5 14.Web Service Security, 2h, Learning outcomes:1,2,3 15.Exam, 2h, Learning outcomes:1,2,3,4,5				
Course content laboratory	1.-, 1h 2.-, 1h 3.-, 1h 4.-, 1h 5.-, 1h 6.-, 1h 7.-, 1h 8.-, 1h 9.-, 1h 10.-, 1h 11.-, 1h 12.-, 1h 13.-, 1h 14.-, 1h 15.-, 1h				
Required materials	Special purpose computer laboratory Whiteboard with markers Overhead projector				
Exam literature	Basic literature: Andrew S. Tanenbaum: Modern Operating Systems, Avi Silberschatz: Operating System Concepts Jon Erickson: Hacking The Art of exploitation Peter Kim: The hacker Playbook 2 (red team and blue team version) Vijay Kumar Velu: Mastering Kali Linux for Advanced Penetration Testing				
Students obligations	-				
Knowledge	exam				

evaluation during semester	
Knowledge evaluation after semester	Exam
Student activities:	Aktivnost ECTS (Written exam) 3 (Oral exam) 2
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22714;
Proposal made by	dr.sc. Davor Cafuta, prof.v.š. 01.01.2019.

Code WEB/ISVU	23078/85250	**ECTS**	5.0	**Academic year**	2018/2019

Name	Databases
Status	4th semester - Software engineering (Redovni raarstvo) - obligatory course4th semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home 15+45 (15+30+0+0) 90
Teachers	Lectures:1. Tin Kramberger struč. spec. ing. techn. inf., pred. Auditory exercises: Tin Kramberger struč. spec. ing. techn. inf., pred. Laboratory exercises: Brigitta Cafuta Laboratory exercises: Renata Kramberger Laboratory exercises: Tin Kramberger struč. spec. ing. techn. inf., pred.
Course objectives	Students need to grasp the concept, properties and role of databases and data mining systems in an information system. Practical work with the database management system will enable them to qualify students to familiarize themselves and master different methods of handling databases.
Learning outcomes:	1.ability to build a database model. Level:6,7 2.ability to design normalized database. Level:6 3.ability to create basic SQL queries. Level:6,7 4.ability to construct SQL queries with data filtering. Level:6,7 5.ability to control embedded SQL functions. Level:6,7 6.ability to connect multiple data tables using SQL queries. Level:6,7 7.ability to sort and group data retrieved by a query. Level:6 8.ability to compare an outer SQL query with an inner SQL query. Level:6,7 9.ability to organize and optimize the database using indexes. Level:6,7
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Modelling Discussion Questions and answers
Methods of carrying out auditory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Interactive problem solving
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Interactive problem solving
Course content lectures	1.Introduction, primary and foreign, database design, 2h, Learning outcomes:1,2 2.Data types, model, normalization, 2h, Learning outcomes:1,2 3.Basic DDL and DML clauses, 2h, Learning outcomes:3,4 4.String, date, and agregate functions, NULL values, 2h, Learning outcomes:3,4,5 5.Cartesian product, natural join, 2h, Learning outcomes:3,4,5,6 6.Join, 2h, Learning outcomes:3,4,5,6 7.Alias, 2h, Learning outcomes:3,4,5,6 8.Group by, having, 2h, Learning outcomes:7 9.Subselect, 2h, Learning outcomes:8 10.Keys, indexes, full text indexes, 2h, Learning outcomes:9 11.Query optimization, 2h, Learning outcomes:9 12.Creating and restoring database backups, 2h, Learning outcomes:9 13.Working with another database system and tools, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 14.Guest lecturer, 2h 15.Repeat for the final exam, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
Course content auditory	1.No classes, 2h 2.No classes, 2h 3.Database design, 2h, Learning outcomes:1 4.Database normalization, 2h, Learning outcomes:1,2 5.Database import, basic DDL and DML clauses, 2h, Learning outcomes:3 6.Functions and the WHERE clause, 2h, Learning outcomes:3,4,5 7.Cartesian product, natural join, functions, 2h, Learning outcomes:4,5,6 8.JOIN, 2h, Learning outcomes:4,5,6 9.Colloquium, 2h, Learning outcomes:1,2,3,4,5,6 10.Aliases, 2h, Learning outcomes:4,5,6 11.GROUP BY, ORDER BY, HAVING clauses, 2h, Learning outcomes:6,7 12.Subselect, 2h, Learning outcomes:6,8 13.Indexes, 2h, Learning outcomes:9 14.Compensatory exercises, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 15.Final exam, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
Course content laboratory	1.No classes, 2h 2.No classes, 2h 3.Database design, 2h, Learning outcomes:1 4.Database normalization, 2h, Learning outcomes:1,2 5.Database import, basic DDL and DML clauses, 2h, Learning outcomes:3

6.Functions and the WHERE clause, 2h, Learning outcomes:2,3,4
7.Cartesian product, natural join, functions, 2h, Learning outcomes:4,5,6
8.JOIN, 2h, Learning outcomes:4,5,6
9.Colloquium, 2h, Learning outcomes:1,2,3,4,5,6
10.Aliases, 2h, Learning outcomes:4,5,6
11.GROUP BY, ORDER BY, HAVING clauses, 2h, Learning outcomes:6,7
12.Subselect, 2h, Learning outcomes:6,8
13.Indexes, 2h, Learning outcomes:9
14.Compensation of laboratory exercises, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
15.Final exam, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9

Required materials   General purpose computer laboratory
Whiteboard with markers
Overhead projector

Exam literature   Basic literature:
1. Kramberger, T.; Duk, S.; Kovačević, R.: Baze podataka, TVZ, Zagreb, 2018, ISBN: 978-953-7048-70-9
1. Abraham Silberschatz: DATABASE SYSTEM CONCEPTS SIXTH EDITION, 2011
2. Radovan, M.: Baza podataka, Informator, Zagreb, 1993.

Additional literature:
1. Tkalac, S.: Relacijski model podataka, Informator, Zagreb, 1988.
2. Ullman, D.,J.: Database and Knowledge - base Systems, Computer Science Press, 1999.
3. Date, C.J.: An Introduction to Database Systems, Addison-Wesley publishing Company, New York. 1994.

Students obligations   Presence at all laboratory exercises with a minimum of 10% points

Knowledge evaluation during semester

Code WEB/ISVU	24061/195334	ECTS	5.0	Academic year	2018/2019
Name	eBook design				
Status	6th semester - Computer systems and network engineering (Redovni raarstvo) - elective course6th semester - Software engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 90	
Teachers	Lectures:1. dr.sc. Maja Turčić pred. Laboratory exercises:dr.sc. Maja Turčić pred.				
Course objectives	To introduce students to the concept of teamwork applied in installation of complex application programs, together with the risks and ways of their compensation				
Learning outcomes:	1.ability to analyse the users' requests and limitations before the development phase. Level:6 2.ability to design modules which fit into the whole of an application. Level:6 3.ability to organise team work and cooperation . Level:6,7 4.ability to propose alternative approaches to solving the same problem. Level:6,7 5.ability to present the current state and the advancements achieved in the development of an application . Level:6,7 6.ability to write documentation . Level:6,7 7.ability to prepare tests to check the functionality of an application. Level:6,7 8.ability to plan the installation and introduction of an application. Level:6,7				
Methods of carrying out lectures	Guest lecturer Case studies Demonstration Discussion Questions and answers Seminar, students presentation and discussion				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Group problem solving Discussion, brainstorming Interactive problem solving				
Course content lectures	1.Project groups. Application description. , 2h, Learning outcomes:1 2.Project groups. Application description. , 2h, Learning outcomes:1 3.Guest lecturer., 2h, Learning outcomes:1,3 4.User requirements and constraints, 2h, Learning outcomes:1 5.Application features., 2h, Learning outcomes:2,4 6.Working on module development . Options to consider., 2h, Learning outcomes:2,3 7.Working on module development . Progress report., 2h, Learning outcomes:2,3,5 8.Working on module development . Progress report., 2h, Learning outcomes:2,3,5 9.Working on module development . Progress report., 2h, Learning outcomes:2,3,5 10.Working on module development . Progress report., 2h, Learning outcomes:2,3,5 11.Working on module development . Progress report., 2h, Learning outcomes:2,3,5 12.Working on module development . Documenting. , 2h, Learning outcomes:6 13.Presentation., 2h, Learning outcomes:5,6 14.Presentation., 2h, Learning outcomes:4,5,6 15.Presentation., 2h, Learning outcomes:4,5,6				
Course content laboratory	1.Working on module development . Progress report., 2h, Learning outcomes:1,5,6 2.Working on module development . Progress report., 2h, Learning outcomes:1,5,6 3.Working on module development . Progress report., 2h, Learning outcomes:1,5,6 4.Working on module development . Progress report., 2h, Learning outcomes:1,5,6 5.Working on module development . Progress report., 2h, Learning outcomes:1,5,6 6.Working on module development . Progress report., 2h, Learning outcomes:1,5,6 7.Working on module development . Progress report., 2h, Learning outcomes:1,5,6 8.Presentation., 2h, Learning outcomes:1,5,6 9.Presentation., 2h, Learning outcomes:1,5,6 10.Presentation., 2h, Learning outcomes:1,5,6 11.Presentation., 2h, Learning outcomes:1,5,6 12.Presentation., 2h, Learning outcomes:1,5,6 13.Presentation., 2h, Learning outcomes:1,5,6 14.Presentation., 2h, Learning outcomes:1,5,6 15.Presentation., 2h, Learning outcomes:1,5,6				
Required materials	Special purpose computer laboratory Whiteboard with markers Overhead projector				
Exam literature	Basic literature: 1. Priručnik za uporabu odabranog komercijalnog programskog paketa Additional literature: 1. Y.F. Musaji: Integrated Auditing of ERP Systems, John Wiley Sons, 2002 2. T.F. Wallace, M.H. Kremza: ERP:Making It Happen: The Implementers Guide to Success with Enterprise Resource Planning, John Wiley Sons, 2000				
Students obligations	maximum of 3 absences from exercises				
Knowledge	Redovitost pohaa#15#10#50$Programski zadatak#1#90#50$				

evaluation during semester	
Knowledge evaluation after semester	written and oral exams
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22649;

Code WEB/ISVU	23369/154957	**ECTS**	7.0	**Academic year**	2018/2019
Name	Electrical Engineering and Electronics Basics				
Status	2nd semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			45+45 (30+15+0+0) 120	
Teachers	Lectures:1. Željko Stojanović Auditory exercises: Eugen Poljičak mag.ing.eit Laboratory exercises: Eugen Poljičak mag.ing.eit				
Course objectives	Student should obtain an overview over contemporary electronic devices and master basic circuit analysis methods in order to evaluate the performance ofelectronic products.				
Learning outcomes:	1.Formulate a mathematical solution to a electric circuit or its part by using basic methods of circuit analysis (Kirchhoff's laws and phasors).. Level:6,7 2.Include the features of nonlinear and multipole electronic components into a mathematical solution to a circuit.. Level:6,7 3.Calculate currents and voltages in simple electronic and electrical circuits with several components.. Level:6 4.Draw a scheme of basic electrical and electronic circuits.. Level:6 5.Sketch a graph of a sinusoidal signal from a given equation and vice versa.. Level:6 6.Draw symbols and characteristics of basic electronic components.. Level:6 7.Design a simple electronic circuit (digital switch, amplifier, comparator and trigger, rectifier, stabilizer, filter, indicator light, heater, multivibrator, A/D converter, SH circuit).. Level:6 8.Conduct laboratory measurements of basic quantities in electrical circuits (current, voltage, waveform with its characteristic values, time relationships).. Level:6,7 9.Analyse electrical circuits by using simple simulation programs.. Level:6 10.Estimate the value of a physical quantity in an electrical circuit, based on physical laws and environment influence.. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Discussion				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other Short tests.				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Discussion, brainstorming Computer simulations				
Course content lectures	1.Introduction. Basic concepts. Resistors., 3h, Learning outcomes:1,4,6,10 2.Basic electricity laws. Basic electrical instruments and power sources. Electrical work, energy and power., 3h, Learning outcomes:1,3,4,7,10 3.Electrostatics. Capacitance., 3h, Learning outcomes:1,3,6,10 4.Capacitors. RC circuits., 3h, Learning outcomes:1,3,4,6,7,10 5.Magnetism, magnetic force, electric motors., 3h, Learning outcomes:1,7,10 6.Electromagnetic induction, self induction, mutual induction. Alternating current, generator, transformer., 3h, Learning outcomes:1,4,5,6,7,10 7.Alternate current responses of resistor, condenser and inductor. Apparent, reactive and real power. Application of phasor calculus., 3h, Learning outcomes:1,3,4,7,10 8.Concept, disciplines and history of electronics. Nonlinear and multiport elements in circuits. Fundamentals of semiconductors., 3h, Learning outcomes:1,2,3,4,6,7,9,10 9.PN-Junction. Diodes., 3h, Learning outcomes:1,2,3,4,6,7,10 10.Applications of diodes: rectifiers, stabilizers and limiters., 2h, Learning outcomes:1,2,3,4,6,7,10 Transistors: basic concepts and types., 1h, Learning outcomes:2,3,4,6,7,10 11.Bipolar transistors ans applications., 3h, Learning outcomes:1,2,3,4,6,7,10 12.Unipolar transistors and applications., 2h, Learning outcomes:1,2,3,4,6,7,10 Amplifiers: concepts, cascading and decibels., 1h, Learning outcomes:1,3,4,7,10 13.Operational amplifiers., 3h, Learning outcomes:1,3,4,6,7,10 14.Multivibrators: bistable, monostable, astable. Schmitt trigger., 3h, Learning outcomes:1,3,4,6,7,10 15.A/D converters. SH circuits., 3h, Learning outcomes:1,3,4,6,7,10				
Course content auditory	1.Physical quantities and units. Ohms law and resistors., 2h, Learning outcomes:1,3,4,6,7,10 2.Serial and parallel connections of resistors. Analysis of circuits by Kirchhoffs laws. , 2h, Learning outcomes:1,3,4,6,7,10 3.Analysis of circuits by Kirchhoffs laws. Voltage loss, open circuit, short circuit., 2h, Learning outcomes:1,3,4,7,10 4.Voltage loss, open circuit, short circuit. Electrical work, energy and power., 2h, Learning outcomes:1,3,4,7,10 5.Electrical work, energy and power. Electrostatics., 2h, Learning outcomes:1,3,4,6,7,10 6.RC-circuits and battery - charging and discharging., 2h, Learning outcomes:1,3,4,6,7,10 7.Magnetic force, electric motors., 2h, Learning outcomes:1,3,4,10 8.Induced voltage., 2h, Learning outcomes:1,3,4,6,7,10 9.Sinusoide. Sinusoidal steady-state in basic RLC circuits., 2h, Learning outcomes:1,3,4,5,7,10 10.Application of phasor calculus. Ideal transformer., 2h, Learning outcomes:1,3,4,5,6,7,10 11.Diode circuits. Stabilizers., 2h, Learning outcomes:1,2,3,4,6,7,10 12.Circuits with bipolar transistors., 2h, Learning outcomes:1,2,3,4,6,7,10 13.Bipolar transistor switch and amplifier., 2h, Learning outcomes:1,2,3,4,6,7,10 14.Operational amplifiers - basic properties and circuits., 2h, Learning outcomes:1,2,3,4,6,7,10 15.Mulivibrators and triggers., 2h, Learning outcomes:1,2,3,4,6,7,10				

Course content laboratory	1.No lessons 2.No lessons 3.No lessons 4.Kirchhoffs laws, 2h, Learning outcomes:1,3,6,8,10 5.No lessons 6.No lessons 7.RC- circuits responses, 2h, Learning outcomes:6,8,10 8.No lessons 9.No lessons 10.No lessons 11.No lessons 12.Diode and rectifiers, 2h, Learning outcomes:4,6,8,10 13.Bipolar junction transistor switch, 2h, Learning outcomes:4,6,8,10 14.Operational amplifier, 2h, Learning outcomes:3,4,6,8,10 15.Multivibrators, 2h, Learning outcomes:2,3,8
Required materials	Basic: classroom, blackboard, chalk... Special purpose laboratory Video equipment Maquette Operating supplies electronic components-resistors, tranistrors, diodes, capacitors, integrated circuits, printed circuit boards, protoboards
Exam literature	Osnovna: 1. E. Stanić, Osnove elektrotehnike, Školska knjiga 2. J. Grilec, D. Zorc, Osnove elektronike, Školska knjiga 3. Ž. Stojanović, Osnove elektrotehnike i elektronike - predavanja, 2018 Additional literature: 1. M. Nahvi, J.A. Edminister: Schaum's Outline of Electric Circuits, McGraw-Hill
Students obligations	Laboratory attendance (100%) and minimal total score (25%) during the semester.
Knowledge evaluation during semester	Written tests (2) 90 points Laboratory work (5) 10 points Total 100 points Final grade with minimum of 8 points of laboratory work and each written test with minimum of 50% : 63-76 points (3) 76-90 points (4) 90-100 points (5) Written test grades without of minimum of 8 points of laboratory work or each written test with minimum of 50% : kolokviju: 50-63 points (2) 63-76 points (3)
Knowledge evaluation after semester	Written exam and oral exam. Minimum of 50% from written exam required for attending oral exam. Ocjene less than 50 % (1) from 50 to 62 % (2) from 62 to 73 % (3) from 73 to 88 % (4) from 89 to 100 % (5) Optional seminar work.
Student activities:	Aktivnost ECTS (Experimental work) 1 (Constantly tested knowledge) 5 (Classes attendance) 1
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22743;
Proposal made by	Željko Stojanović

Code WEB/ISVU	23070/84849	ECTS	3.0	Academic year	2018/2019
Name	English for Computing				
Status	1st semester - Undergraduate professional study in computing (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (30+0+0+0) 30	
Teachers	Lectures:1. dr.sc. Biljana Stojaković ,prof.v.š. u trajnom zvanju Auditory exercises:dr.sc. Ivana Špiranec prof. visoke škole Auditory exercises: Zoran Vulelija				
Course objectives	To develop language skills related to developing skills of understanding native and non-native English speakers and original texts; learning how to use various dictionnaries; developing communicating skills. To develop students				
Learning outcomes:	1.ability to analyse the position of the English language and its importance in the field of expertise (computing) and in global communication. Level:6 2.ability to generate individually oral and written communication in English. Level:6,7 3.ability to be skilled in reading texts related to the field of expertise. Level:6,7 4.to translate texts related to the field of expertise. Level:6,7 5.ability to categorize the computing terminology in both English and Croatian. Level:6 6.ability to give comments on various issues arising in the English of computing, both in English and in Croatian. Level:6 7.ability to distinguish between the vocabulary and grammar structures in the English of computing and in standard English. Level:6 8.ability to give comments on the quality of the English language on the Internet, especially of the content related to the field of expertise. Level:6 9.ability to analyse online translators. Level:6 10.ability to present in English the content related to computing . Level:6,7 11.ability to devise dialogues related to the English of computing. Level:6,7 12.to analyse various types of dictionary. Level:6 13.to make a difference between the Croatian free word order and the English fixed word order. Level:6 14.to generate sentences applying the sequence of tenses. Level:6,7 15.to identify both regular and irregular forms of English plural. Level:6 16.to analyse the English verb aspect. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Discussion Questions and answers Seminar, students presentation and discussion Homework presentation				
Methods of carrying out auditory exercises	Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Essay writing Discussion, brainstorming Interactive problem solving Workshop				
Course content lectures	1.English as a lingua franca, 2h, Learning outcomes:1 2.English in IT and Computing, 2h, Learning outcomes:1,4,5 3.Computing and IT terminology , 2h, Learning outcomes:4,5 4.Croatiian computing terminology, 2h, Learning outcomes:1,2,3,4,5,6 5.English language on the Internet, 2h, Learning outcomes:1,4,5,6,7 6.Machine translation, 2h, Learning outcomes:7,8,9 7.Online Machine Translators, 2h, Learning outcomes:7,8,9 8.Dictionary, 2h, Learning outcomes:3,12 9.Learning foreign languages online, 2h, Learning outcomes:6 10.Preliminary exam, 2h, Learning outcomes:1,2,3,5,6,7,8,9,10 11.Direct/Indirect Speech, 2h, Learning outcomes:13 12.Sequence of tenses, 2h, Learning outcomes:13,14 13.Croatian and English noun plurals, 2h, Learning outcomes:15 14.English verb tense aspect, 2h, Learning outcomes:16 15.Preliminary exam, 2h, Learning outcomes:11,12,13,14,15,16				
Course content auditory	1.Computer applications; English verb tenses, 2h, Learning outcomes:2,4,7,10 2.Types of computer; English verb tenses (exercises), 2h, Learning outcomes:2,4,6,10 3.Input devices; Active voice/Passive voice, 2h, Learning outcomes:2,3,4,7,10 4.Scanner; Active voice/Passive voice, 2h, Learning outcomes:2,3,4,6,10 5.Output devices; Comparision of adjectives and adverbs, 2h, Learning outcomes:2,3,4,6,10 6.Preliminary exam, 2h, Learning outcomes:2,3,4,7,10 7.Data storage; Conditional clauses, 2h, Learning outcomes:2,4,10 8.Magnetic data storage; Conditional clauses and sequence of tenses, 2h, Learning outcomes:2,3,10 9.Optical storage; Modal verbs, 2h, Learning outcomes:2,3,4,7,10 10.Flash memory; Modal verbs, 2h, Learning outcomes:2,3,4,10 11.My ideal computer system; Direct/Indirect speech, 2h, Learning outcomes:2,3,4,6,10,13 12.In a cybercafe; Sequence of tenses, 2h, Learning outcomes:1,2,6,13,14 13.Buying a computer; Plural of nouns, 2h, Learning outcomes:2,3,10,15 14.Mobile phones; English verb tense aspect, 2h, Learning outcomes:1,2,9,16				

	15.Preliminary exam, 2h, Learning outcomes:2,3,4,7,10
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Video equipment Operating supplies
Exam literature	1.Professional English in Use ICT, for Computer and Internet, Esteras, Fabre, Cambridge University Press 2. materijali s predavanja (objavljeni na web stranicama kolegija) sastavljeni od tekstova preuzetih iz suvremene stručne i metodičke literature 3. Kiš, M. Englesko-hrvatski, hrvatsko-engleski školski informatički rječnik. Naklada Ljevak, Zagreb, 2003. 4. Stojaković,B. Skripta English for computer users I 5. Mihaljević, M. Hrvatsko računalno nazivlje, 1993
Students obligations	Regular attendance in both lectures and exercies (maximum of 3 absences from exercises are tolerated).
Knowledge evaluation during semester	2 preliminary exams in both lectures and exercises; homework
Knowledge evaluation after semester	Written and oral exam.
Student activities:	Aktivnost ECTS (Oral exam) 3
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22848;
Proposal made by	Professor Biljana Stojaković, PhD

Code WEB/ISVU	23096/91910	ECTS	19.0	Academic year	2018/2019
Name	Final thesis				
Status	6th semester - Software engineering (Redovni raarstvo) - elective course6th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			15+225 (225+0+0+0) 330	
Teachers	Lectures:1. dr.sc. Željko Širanović prof.v.š.				
Course objectives	To teach students how to use the acquired knowledge in solving engineering tasks				
Learning outcomes:	1.ability to identify a problem or a development area related to a subject assigned or approved by a mentor. Level:6 2.ability to analyse the achievements in the area. Level:6 3.ability to analyse a problem or a development area. Level:6 4. ability to devise a solution to a problem. Level:6,7 5.ability to provide a practical solution to a problem. Level:6,7 6.ability to reach a conclusion about the reaches made and the possibility of generalisation of work . Level:6,7 7.ability to present one's work results. Level:6,7				
Methods of carrying out lectures	Simulations Modelling Questions and answers				
Methods of carrying out auditory exercises	Other				
Course content lectures	1.General purpose of the thesis, broader and a narrower scope of work, 2h, Learning outcomes:1,2,3,4,5,6,7 2.The structure of the final thesis: introduction, theoretical and practical, work results, conclusion, summary, 2h, Learning outcomes:1,2,3,4,5,6,7 3.Form thesis per chapter, guidance and reference to the literature, manufacture and labeling of graphical components (images, tables, diagrams, etc.), 2h, Learning outcomes:1,2,3,4,5,6 4.Defining the preparation and planning of the thesis, research relevant sources (literature), 2h, Learning outcomes:1,2,3,4,5,6,7 5.Development of materials for public presentation and preparation for a public presentation, 2h, Learning outcomes:1,2,3,4,5,6,7 6.Individual work with students (individual consultation by appointment), 2h 7.Individual work with students (individual consultation by appointment), 2h 8.Individualni rad sa studentima prema dogovoru, 2h 9.Individual work with students (individual consultation by appointment), 2h 10.Individual work with students (individual consultation by appointment), 2h 11.Individual work with students (individual consultation by appointment), 2h 12.Individual work with students (individual consultation by appointment), 2h 13.Individual work with students (individual consultation by appointment), 2h 14.Individual work with students (individual consultation by appointment), 2h 15.Individual work with students (individual consultation by appointment), 2h				
Course content auditory	1.The agreement with the mentor and define specific issues (engineering area and topic name) for the final work, 2h 2.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 3.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 4.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 5.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 6.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 7.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 8.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 9.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 10.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 11.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 12.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 13.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 14.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h 15.Student independently develops his/her theoretical and practical thesis (the guidance and supervision by a mentor), 2h				
Required materials	Overhead projector				

Exam literature	Konzultacije sa mentorom ovisn o području i temi rada
Students obligations	Regular class attendance 10% Made final project according to the instructions on the final paper 90% Signature "Applications for the evaluation and defense of final thesis" signed by the mentor
Knowledge evaluation during semester	Regular attendance of lectures and consultations 10% Made final project according to the instructions on the final paper 90%
Knowledge evaluation after semester	Regular attendance of lectures and consultations 10% Made final project according to the instructions on the final paper 90%
Student activities:	Aktivnost ECTS (Project) 19
Remark	This course can not be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Fizika Students cannot enroll in this course unless they have passed Objektno orijentirano programiranje Students cannot enroll in this course unless they have passed Uvod u web tehnologije Students cannot enroll in this course unless they have passed Matematika II Students cannot enroll in this course unless they have passed Programiranje Students cannot enroll in this course unless they have passed Osnove elektrotehnike i elektronike Students cannot enroll in this course unless they have passed Primjena računala Students cannot enroll in this course unless they have passed Kineziološka kultura II Students cannot enroll in this course unless they have completed Seminar
ISVU equivalents:	39173;39692;200088;

Code WEB/ISVU	23071/85203	ECTS	3.0	Academic year	2018/2019
Name	German for computing				
Status	1st semester - Undergraduate professional study in computing (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (30+0+0+0) 30	
Teachers	Lectures:2. Doc. dr. sc. Lidija Tepeš Golubić v. pred. Auditory exercises:1. Doc. dr. sc. Lidija Tepeš Golubić v. pred.				
Course objectives	Language skills, german language for specific purposes				
Learning outcomes:	1.ability to be skilled in reading texts related to the field of expertise, to find relevant information in a text. Level: 2.ability to demonstrate the knowledge of computing terminology and the ability to use it in communication. Level: 3.ability to demonstrate the knowledge of grammar structures. Level: 4.ability to present a text related to the field of expertise and provide an opinion on it. Level: 5.ability to use properly all of 4 language skills. Level: 6.ability ability to use dictionaries (monolingual and bilingual). Level: 7.ability to translate specific professional papers from German into Croatian. Level:				
Methods of carrying out lectures	Ex cathedra teaching Discussion Questions and answers Homework presentation Other				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Interactive problem solving Other				
Course content lectures	1.Introductory lecture, 2h, Learning outcomes:1,5 2.Importance of foreign language study , 2h, Learning outcomes:1,5 3.Grammar of the German language - Nouns, 2h, Learning outcomes:2,3,4 4.New media, 2h, Learning outcomes:2,3,4,5 5.Grammar of the German language - Verbs, 2h, Learning outcomes:2,3 6.Computer and Network Technology , 2h, Learning outcomes:2,3,4,5,7 7.Colloquium 1, 2h, Learning outcomes:1,2,3,4,5,6,7 8.Social networks, 2h, Learning outcomes:2,3,4,5,7 9.Social networks, 2h, Learning outcomes:4,5,7 10.Grammar of the German language - Verbs with separable prefixes, 2h, Learning outcomes:2,3 11.Computer Basics, 2h, Learning outcomes:4,5,7 12.Curriculum vitae, 2h, Learning outcomes:2,3 13.Dictionary and vocabulary, 2h, Learning outcomes:3,4,5,6 14.German literature, 2h, Learning outcomes:3,6,7 15.Colloquium 2, 2h, Learning outcomes:1,2,3,4,5,6,7				
Course content auditory	1.Introductory lecture, 2h, Learning outcomes:1,5 2.Importance of foreign language study, 2h, Learning outcomes:1,5 3.Grammar of the German language - Nouns, 2h, Learning outcomes:2,3,4 4.New media, 2h, Learning outcomes:2,3,4,5 5.Grammar of the German language - Verbs, 2h, Learning outcomes:2,3 6.Grammar of the German language - Verbs, 2h, Learning outcomes:2,3 7.Colloquium 1, 2h, Learning outcomes:1,2,3,4,5,6,7 8.Social networks, 2h, Learning outcomes:1,2,4,5,7 9.Computer Basics, 2h, Learning outcomes:1,2,4,5,7 10.Curriculum vitae, 2h, Learning outcomes:1,2,5,6 11.Curriculum vitae, 2h, Learning outcomes:1,2,5,6 12.Dictionary and vocabulary, 2h, Learning outcomes:3,4,5,6 13.German literature, 2h, Learning outcomes:1,3,6,7 14.German literature, 2h, Learning outcomes:1,3,6,7 15.Colloquium 2, 2h, Learning outcomes:1,2,3,4,5,6,7				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Special equipment				
Exam literature	Basic literature: 1. Marčetić, T.: Pregled gramatike njemačkoga jezika, Školska knjiga, Zagreb 2. Hansen-Kokoruš R., Matešić J., Pečur-Medinger Z., Znika M.: Njemačko-hrvatski univerzalni rječnik, Zagreb, 2005. 3. izbor tekstova objavljenih na web stranicama kolegija, tekstovi preuzeti iz suvremene stručne literature, časopisa i s Interneta				
Students obligations	Attending classes and participation in the process				
Knowledge evaluation during semester	Preliminary exam; seminar paper				

Knowledge evaluation after semester	Written and/or oral exam	
Student activities:	Aktivnost	ECTS
	(Activity in class)	1
	(Written exam)	1
	(Report)	1
Remark	This course can be used for final thesis theme	
Prerequisites:	No prerequisites.	
ISVU equivalents:	24374;	
Proposal made by	PhD. Lidija Tepeš Golubić, senior lecturer, 1st of June 2015	

Code WEB/ISVU	23633/156980	ECTS	4.0	Academic year	2018/2019
Name	Introduction to Artificial Intelligence				
Status	4th semester - Software engineering (Redovni raarstvo) - elective course4th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 60	
Teachers	Lectures:1. Dr. sc. Marko Horvat v. pred. Laboratory exercises:Dr. sc. Marko Horvat v. pred. Laboratory exercises: Tamara Ivelja mag. ing. geod. et. geoinf. Laboratory exercises: Domagoj Tuličić				
Course objectives	Review of artificial intelligence methods and procedures as well as different approaches in this area. Students will understand the advantages and disadvantages of different approaches and identify problems to properly apply various artificial intelligence methods. Students will gain hands-on experience in developing software solutions for various problems of artificial intelligence within actual applications, including knowledge representation, automated reasoning, problems optimization, image recognition and scene understanding.				
Learning outcomes:	1.ability to discern the basic concepts of artificial intelligence. Level:6 2.ability to discern symbolic, connectivistic and probabilistic approaches to artificial intelligence. Level:6 3.ability to solve simple logical problems by applying logic programming. Level:6 4.ability to solve simple logic problems using automatic reasoning procedures. Level:6 5.ability to design and develop a simple image recognition system for a particular application. Level:6 6.ability to compare different approaches to representation of crisp and fuzzy knowledge. Level:6,7 7.ability to compare applicability of certain approaches in artificial intelligence to a real problem. Level:7 8.ability to assess philosophical aspects of artificial intelligence. Level:7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Modelling Discussion Questions and answers Seminar, students presentation and discussion Homework presentation				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Group problem solving Data mining and knowledge discovery on the Web Discussion, brainstorming				
Course content lectures	1.Overview of artificial intelligence areas. Historical development. Development trends and the latest trends. Relations with other areas. The concept of intelligence and the Turing Test., 2h, Learning outcomes:1 2.Solving problems by searching the state space. Search strategies., 2h, Learning outcomes:1,2 3.Symbolic logic. Logic programming. Proposition logic., 2h, Learning outcomes:1,2,3 4.First-order logic. Predicate calculus., 2h, Learning outcomes:1,2,3 5.Prolog computer language. SWI-Prolog., 2h, Learning outcomes:2,3 6.Advanced topics in Prolog. , 2h, Learning outcomes:3,4 7.Optimization problems. Evolutionary computing. Genetic algorithm. , 2h, Learning outcomes:3,4,7 8.Uncertain knowledge and reasoning. Fuzzy logic and fuzzy reasoning., 2h, Learning outcomes:6,7 9.Machine learning. Supervised, unsupervised and reinforcement learning., 2h, Learning outcomes:6,7 10.Computer vision. Digital camera and multispectral image analysis., 2h, Learning outcomes:5,7 11.Advanced topics in computer vision. Image compression, transformation and classification., 2h, Learning outcomes:5,7 12.Computer applications for image processing and analysis., 2h, Learning outcomes:5,7 13.Advanced computer applications for image processing and analysis., 2h, Learning outcomes:5,7 14.Information retrieval. Text representation and categorization., 2h, Learning outcomes:6,7 15.Future of artificial intelligence. Summary., 2h, Learning outcomes:8				
Course content laboratory	1.No lab, 2h 2.No lab, 2h 3.Lab 1: Proposition logic, 2h, Learning outcomes:1,3 4.Lab 2: Prolog, 2h, Learning outcomes:2,3,4 5.Lab 3: Prolog, 2h, Learning outcomes:2,3,4 6.Lab 4: Genetic algorithm, 2h, Learning outcomes:2,4 7.Lab 5: Genetic algorithm, 2h, Learning outcomes:2,4 8.Lab 6: Fuzzy logic, 2h, Learning outcomes:4,6 9.Lab 7: Fuzzy logic, 2h, Learning outcomes:4,6 10.Lab 8: Image processing and computer vision, 2h, Learning outcomes:5,7 11.Lab 9: Image processing and computer vision, 2h, Learning outcomes:5,7 12.Lab 10: Image processing and computer vision, 2h, Learning outcomes:5,7 13.Lab 11: Text analysis and retrieval, 2h, Learning outcomes:2,7 14.Lab 12: Text analysis and retrieval, 2h, Learning outcomes:2,7 15.Lab review, 2h, Learning outcomes:1,2,3,4,5,6,7,8				
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector				

Exam literature	Basic literature: 1. S. Russell, P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, 3. izdanje, 2009. 2. George F. Luger. Artificial Intelligence: Structures and Strategies for Complex Problem Solving. Addison-Wesley, 2005. 3. K. Demaagd, A. Oliver, N. Oostendorp, K. Scott: "Practical Computer Vision with SimpleCV", O'Reilly Media, 2012.
Students obligations	Attendance of lectures and laboratory exercises on a regular basis. Maximum of 50% absences from lectures. Minimum of 50% points from laboratory exercises.
Knowledge evaluation during semester	Midterm exam: 50 points
Knowledge evaluation after semester	Attendance of lectures and laboratory exercises on a regular basis. Maximum of 50% absences from lectures. Minimum of 50% points from laboratory exercises.
Student activities:	Aktivnost ECTS (Classes attendance) 1 (Written exam) 1 (Oral exam) 1 (Project) 1
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Programiranje
ISVU equivalents:	111518;200080;
Proposal made by	dr.sc. Marko Horvat, pred., 05.06.2017.

Code WEB/ISVU	23014/63200	ECTS	4.0	Academic year	2018/2019
Name	Introduction to Unix Systems				
Status	4th semester - Software engineering (Redovni raarstvo) - obligatory course4th semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 60	
Teachers	Lectures:1. dr.sc.rač. Ivica Dodig , prof.v.š. Lectures:2. dr.sc.rač. Davor Cafuta , prof.v.š. Laboratory exercises:dr.sc.rač. Davor Cafuta , prof.v.šk.				
Course objectives	Enable students to practically resolve tasks in relation to office informatization on various operating systems.				
Learning outcomes:	1.ability to create files and directories on a UNIX server through a command line. Level:6,7 2.ability to generate summarized data through a command line on a UNIX server. Level:6,7 3.ability to rearrange files on a UNIX server to make the service run smoothly through a command line. Level:6,7 4.abilityto create the permissions necessary to work with files and directories on UNIX through a command line. Level:6,7 5.ability to build a virtual UNIX based server. Level:6 6.ability to set the UNIX core in order to improve the hardware performance. Level:6,7 7.abilityto design a network for a small-sized office with a UNIX based server . Level:6 8.ability to integrate the work of the Windows clients and of a UNIX server. Level:6,7 9.ability to create a service on a UNIX server to assign IP addresses to clients. Level:6 10.ability to test the functioning of a network in a small-sized office. Level:6 11.ability to combine the work of the Windows programs and of UNIX OS. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Modelling Discussion Questions and answers				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations				
Course content lectures	1.History and instalation of open source operating system, 2h, Learning outcomes:4 2.Basic commands in UNIX shell., 2h, Learning outcomes:1 3.Advanced usage of the UNIX shell., 2h, Learning outcomes:2,3 4.Specific UNIX commands., 2h, Learning outcomes:2,3 5.Multiuser administration., 2h, Learning outcomes:3,4 6.Permitions in open source operating systems., 2h, Learning outcomes:3,4 7.Command line text editors., 2h, Learning outcomes:2 8.Basic shell scripting., 2h, Learning outcomes:3 9.Organization of the operating system., 2h, Learning outcomes:6,11 10.Process management., 2h, Learning outcomes:6,11 11.Packet management., 2h, Learning outcomes:6,11 12.Kernel compiling, 2h, Learning outcomes:6,11 13.Network administartion and basic firewall options., 2h, Learning outcomes:7,8 14.DHCP service administration, 2h, Learning outcomes:9,10 15.Theoretical exam, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11				
Course content laboratory	1.-, 2h 2.Basic commands in UNIX shell., 2h, Learning outcomes:1 3.Advanced usage of the UNIX shell., 2h, Learning outcomes:2,3 4.Specific UNIX commands., 2h, Learning outcomes:2,3 5.Multiuser administration., 2h, Learning outcomes:3,4 6.Permitions in open source operating systems., 2h, Learning outcomes:3,4 7.Command line text editors., 2h, Learning outcomes:2 8.Basic shell scripting., 2h, Learning outcomes:3 9.-, 2h 10.Process management., 2h, Learning outcomes:7,11 11.Packet management., 2h, Learning outcomes:6,11 12.Kernel compiling, 2h, Learning outcomes:6,11 13.Network administartion and basic firewall options., 2h, Learning outcomes:7,8 14.DHCP service administration, 2h, Learning outcomes:9,10 15.Practical exam, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11				
Required materials	Special purpose computer laboratory Whiteboard with markers Overhead projector Special equipment				
Exam literature	Basic literature: 1. Materijali uz predmet (internet stranice) 2. C. Hunt,TCP/IP Network Administration, 3rd edition, O'Reilly, 2002. 3. S. Pritchard, et.all, LPI Linux Certification, 2nd edition, O'Reilly, 2006. Additional literature: 1. Linux Magazin (izdvojeni brojevi)				

Students obligations	Minimum of 13 point from laboratory work.
Knowledge evaluation during semester	Course is divided into 7 parts. Upon every part last one is checked with theoretical exam (3points x 6 parts) and practical work (1 point). At the end of the semester theoretical exam (21 point) and practical exam (54 point) checks all 7 parts. More information in first lecture in repository of the course.
Knowledge evaluation after semester	Laboratory points are obtained during semester. Additionaly, theoretical exam (21 point) and practical exam (54 point) checks all 7 parts. More information in first lecture in repository of the course.
Student activities:	Aktivnost ECTS (Written exam) 4
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Operacijski sustavi
ISVU equivalents:	22717;
Proposal made by	Ivica Dodig, Davor Cafuta (08.01.2014)

Code WEB/ISVU	23094/91686	ECTS	5.0	Academic year	2018/2019
Name	Introduction to WEB Technologies				
Status	2nd semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 90	
Teachers	Lectures: Sanja Kraljević , dipl.ing., v. pred. Laboratory exercises:dr. sc. Roman Domović , prof. Laboratory exercises: Sanja Kraljević , dipl.ing., v. pred. Laboratory exercises: Petar Osterman				
Course objectives	To introduce students to practical and theoretical aspects of using HTML and CSS, the basic markup languages for making the Web based content and layout. Students will learn how to design and code Web pages. The process of building a modern Web site will be presented (from buying a domain name to Web site finalization). [To successfully adopt the course material does not require prior knowledge of the Web development or Web building software.]				
Learning outcomes:	1.ability to distinguish between different languages used for designing Web sites (HTML 4 and 5, CSS 2 and 3); to get familiar with the languages through their theoretical and practical usage, in the ability context of markup languages i upoznati ih kroz njihovu teoretsku i praktičnu dimenziju te u širem kontekstu jezika za obilježavanje (markup languages). Level:6 2.ability to write a code in (X)HTML and in CSS and design a Web page to meet the requests of the W3C validation, contemporary code presentation of characters, basic design, functionality and standards of a semantic Web. Level:6,7 3.ability to design a webpage and to arrange the code elements of a Web page using various techniques: tables, frames, margins, positioning, floating and grids.. Level:6 4.ability to understand why in certain cases one and the same code is shown differently in different browsers; to understand the way in which a browser displays a Web page; to understand how to avoid problems. Level:7 5.ability to compare different criteria which determine the quality of Web sites (benchmark and validation tests).. Level:6,7 6.ability to evaluate tools used for Web site design (browsers, plugins, code editors, office applications and packages, graphical user interfaces, etc.).. Level:7 7.ability to take a critical attitude towards technologies used in the Web site design (videocodecs, audiocodecs, open-source software or platform, the future of HTML and CSS, etc.) .. Level:7 8.ability to anticipate the direction of the development of the technology of data display on the Web using HTML5 and CSS3. . Level:6,7 9.identify future technologies on Web (operating systems on the Internet, a close connection between application software and Web sites, design with multi-resolution interfaces etc.. Level:6 10.ability to identify a need for general computer literacy.. Level:6 11.ability to identify inconstancy of contemporary web technologies and identify a need for continuous improvement.. Level:6 12.ability to give students directions on which knowledge sources to use (printed materials, Internet sources, turorials, etc.).. Level:7 13.ability to plan one's own advancement in JavaScript, server-oriented programming languages and other technologies.. Level:6,7 14.suggest to plan business career by opening own startup company.. Level:6,7 15.ability to integrate more Web pages into Web site and connect them with absolute and relative links.. Level:6,7 16.ability to prepare and optimize images and photos for Web site; choose a suitable format.. Level:6,7 17.ability to formulate webpage key words and to set metadata.. Level:6,7 18.ability to design horizontal or vertical navigation bar, adjust it to a webpage content and ability to know how to code it.. Level:6 19.ability to create a Web page adapted to the needs of different browser width layout or media.. Level:6,7 20.ability to link multimedia elements into a Web page (audio, video, web mapping services).. Level:6,7 21.create visual effects for enriching user experience of web site. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Discussion, brainstorming				
Course content lectures	1.Motivational lecture and introduction to markup languages. Future of web. Internet startups., 2h, Learning outcomes:1,9,10,11,12,13,14,15 2.Web development and markup languages. Validation. Webpage development fundamentals. Webpage design technologies. Basic syntax. Absolute and relative links. Downloads., 2h, Learning outcomes:4,5,6,7,8,9,15 3.Basic web statistical indicators. Header and metadata. Strict, transitional and frame work modes. End of line. Byte-order mark (BOM). Work with images. Text image layout. External links (anchors). Frames. Favicons. Paragraphs. Lists., 2h, Learning outcomes:5,6 4.Character representation and characters support for Croatian. Redirections. iFrames. Anchorage in different frames. Tables and their modifications. HTML forms., 2h, Learning outcomes:6,9,15 5.Features of semantic Web, content and layout aspects. Introduction to CSS. Position of a code in CSS and the relation to HTML. Classes. Identifiers. Background, text, font, link and list selectors. Rising and falling line., 2h, Learning outcomes:7,8,12 6.Box model. Block and inline elements. div and span. Cursors. Borders, margins, paddings. CSS Media Types. CSS priorities. Webpage quality benchmarks: ACID, Pingdom, W3 Validator, Nibbler, GTmetrix. Nonbreaking space. Browsers., 2h, Learning outcomes:5,6,7,12 7.CSS units and measures. Dimensioning. Klassification. Relative, absolute and fixed positioning. Conditional comments for Internet Exporer., 2h, Learning outcomes:1,4 8.Webpage elements composition and structure. Basic design. Horizontal and vertical navigation bar coding. Link stylization and roll-over menu effects., 2h, Learning outcomes:3,4,12 9.Floating - basic and advanced aspects., 2h, Learning outcomes:2,3,7				

10.Responsive web design technology (RWD). Pseudoclasses and i pseudoelements. Lorem ipsum., 2h, Learning outcomes:2,3,8,9

11.Navigation bar using images and image sprites. Corner rounding. Shadows. Code and image optimization. Selector combination. Centering. URI., 2h, Learning outcomes:1,2,3,12

12.Introduction to HTML5, browser support and future of web structure coding. Videocodecs and videoformats. Audiocodecs and audioformats. Flash to HTML5 conversion. Inserting video, audio and geolocation frames., 2h, Learning outcomes:1,4,6,7,8,9,12

13.Introduction to CSS3, browser support and future of web design coding. Browser prefixes. Shadowing, corner rounding, transparency, text effects, gradience. CSS3 navigation bar development., 2h, Learning outcomes:1,3,5,6,7,8,9,12

14.Grid positioning. Webpage validations. Modernizr. Web fonts and formats. Technologies for further study (JavaScript, Dart, Spark, server-oriented programming languages, SEO)., 2h, Learning outcomes:3,9,12,13

15.Final exam preparation., 2h

Course content laboratory	1.no class, 2h 2.First HTML code writing. Exercise related to relative and absolute links, character representation and metadata., 2h, Learning outcomes:2,3 3.Exercise related to external links (anchors) and frames. Work with pictures and favicons. Text markup., 2h, Learning outcomes:2,3,17 4.Exercise related to tables, HTML forms and DOCTYPE., 2h, Learning outcomes:2,3,18 5.First CSS code writing. CSS and HTML linking. CSS markup of background, text, font, links and lists. Building a CSS selectors e-textbook., 2h, Learning outcomes:2,3 6.Exercise related to negative margins positioning. Gradient picture generation., 2h, Learning outcomes:2,3,17 7.Exercise related to relative and absolute positioning., 2h, Learning outcomes:2,3 8.Exercise related to horizontal and vertical navigation with text hover effect., 2h, Learning outcomes:2,3,19 9.Exercise related to floating elements positioning. , 2h, Learning outcomes:2,3 10.Exercise related to responsive webpage design (RWD) depending on webpage width and media., 2h, Learning outcomes:2,3,19 11.Exercise related to making navigation bar with images and image sprites., 2h, Learning outcomes:2,19 12.Exercise related to complete webpage designing, coding and development., 2h, Learning outcomes:2,3 13.Exercise related to making shadows and transparency, rounded corners, text effects and inserting YouTube, Google Maps and audio frames., 2h, Learning outcomes:2,3,20 14.Exercise related to frameworks, grid layout, webpage validation, using browser development tools Mozilla Firebug and Chrome Inspect Elements., 2h, Learning outcomes:2,6,9 15.Final exam preparation., 2h
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector Special equipment
Exam literature	Recenzirana skripta iz kolegija. Prezentacijska skripta s predavanja objavljena na stranicama kolegija. Poglavlja W3Schoolsa s e-tutorijalima o HTML-u, XHTML-u i CSS-u (http://www.w3schools.com/). M. MacDonald, HTML5 - The Missing Manual, O'Reilly, 2014.; 2. D.S.McFarland, CSS3 - The Missing Manual, O'Reilly, 2013. (eng: Reviewed course textbook. Lecture presentation notes (PDF) downloadable on course webpage. W3Schools e-tutorial chapters about HTML, XHTML and CSS (http://www.w3schools.com/ M. MacDonald, HTML5 - The Missing Manual, O'Reilly, 2014. D.S.McFarland, CSS3 - The Missing Manual, O'Reilly, 2013.).
Students obligations	Done laboratories, collected 18 points from 28 possible during the exercises. - 12 exercises * 2 points - 2 short test * 2 points
Knowledge evaluation during semester	40% of the grade is lab (evaluation form of points collected during the exercises) 30% score is first mid-term exam, 30% score is first mid-term exam.
Knowledge evaluation after semester	Lab exercises carries 40% marks. Written exam carries 60% marks.
Student activities:	Aktivnost ECTS (Written exam) 5
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22747;
Proposal made by	Sanja Duk, dipl.ing., 25.5.2016

Code WEB/ISVU	23372/154961	ECTS	5.0	Academic year	2018/2019
Name	Java Programming				
Status	3rd semester - Software engineering (Redovni raarstvo) - obligatory course3rd semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+60 (30+30+0+0) 60	
Teachers	Lectures:1. v.pred. Aleksander Radovan , dipl. ing. Auditory exercises:v.pred. Aleksander Radovan , dipl. ing. Laboratory exercises: Tin Kramberger struč. spec. ing. techn. inf., pred. Laboratory exercises: Davor Lozić pred.				
Course objectives	To introduce students to Java; to enable enable students to acquire the principles and techniques of advanced Java programming; to qualify students to develop an application with a GUI and a database integrated				
Learning outcomes:	1.ability to write a code of an application containing a GUI, business logic and a database. Level:6,7 2.ability to organise a program code into classes and interfaces according to the principles of OOP. Level:6,7 3.ability to design an application which is easily upgradable and adjusted to easy maintenance. Level:6 4.ability to solve various types of practical problems by using the Java FX applications. Level:6 5.ability to design a Java FX application, from a database to a GUI. Level:6 6.ability to give comments on the Java code by means of Javadoc documentation. Level:6 7.ability to plan the upgrade of Java FX applications by achieving new functionality and new modules. Level:6,7 8.ability to relate the knowledge gained in using other programming languages to Java. Level:6,7 9.ability to analyse the users' requests for application functionality. Level:6 10.ability to test the proper operation of an application during its 'life'. Level:6 11.ability to develop a Java FX application by using open source tools and libraries. Level:6,7 12.ability to organise a development environment Eclipse for an efficient development of Java FXapplications. Level:6,7 13.choose advanced features from programming language for solving problems.. Level:7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Interactive lectures with lots of practical examples. The adoption of practical knowledge and techniques used in complex projects. Independently planning and implementation of a Java application with a graphical interface and database. Documentation of ready-made solutions with Javadoc documentation.				
Methods of carrying out auditory exercises	Group problem solving Computer simulations				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Interactive problem solving				
Course content lectures	1.Java programming language basics, 2h, Learning outcomes:8 2.Simple Java programs, 2h, Learning outcomes:8 3.Classes and objects in Java, 2h, Learning outcomes:3,8,9,10,12 4.Object oriented programming in Java, 2h, Learning outcomes:2,3,8,9,10 5.Exceptions in Java, 2h, Learning outcomes:2,3,7,8,9,10,11 6.Writing Javadoc documentation, 2h, Learning outcomes:6 7.Dinamic data structures in Java, 2h, Learning outcomes:3,7,10 8.Generics in Java and lambda expressions, 2h, Learning outcomes:2,3,7,8,9,10,11,13 9.Working with files in Java, 2h, Learning outcomes:3,7,8,9,10,11 10.Programming user interfaces in Java - simple components, 2h, Learning outcomes:2,3,4,7,8,9,10,11,12 11.Programming user interfaces in Java - complex components, 2h, Learning outcomes:2,3,4,7,8,9,10,11,12 12.Connecting Java applications to databases, 2h, Learning outcomes:1,2,3,4,5,7,8,9,10,11 13.Multithreading in Java, 2h, Learning outcomes:2,3,8,9,11 14.Regular expressions in Java, 2h, Learning outcomes:2,3,8,9,11 15.Annotations in Java, 2h, Learning outcomes:2,3,8,9,11				
Course content auditory	1.No classes, 2h 2.No classes, 2h 3.Classes and objects in Java, 2h, Learning outcomes:3,7,8,9,10,11,12 4.Object oriented programming in Java, 2h, Learning outcomes:2,3,6,8,9,10,12 5.Exceptions in Java, 2h, Learning outcomes:2,3,6,8,9,10,12 6.First partial exam, 2h, Learning outcomes:2,3,6,7,8,9,10,11,12 7.Dynamic data structures in Java, 2h, Learning outcomes:2,3,6,8,9,10,11,12 8.Generics in Java and lambda expressions, 2h, Learning outcomes:2,3,7,8,9,10,11,12,13 9.Using files in Java, 2h, Learning outcomes:2,3,7,8,9,10,11,12 10.Using graphical user interface in Java - simple components, 2h, Learning outcomes:2,3,6,7,8,9,10,11,12 11.Using graphical user interface in Java - complex components, 2h, Learning outcomes:2,3,4,6,7,8,9,10,11,12 12.Connecting Java applications to databases, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 13.Multithreading in Java, 2h, Learning outcomes:1,2,3,4,6,7,8,9,10,11,12 14.Second partial exam, 2h, Learning outcomes:2,3,4,6,7,8,9,10,11,12 15.No classes				
Course content laboratory	1.No classes, 2h 2.No classes, 2h 3.Classes and objects in Java, 2h, Learning outcomes:3,7,8,9,10,11,12 4.Object oriented programming in Java, 2h, Learning outcomes:2,3,6,8,9,10,12 5.Exceptions in Java, 2h, Learning outcomes:2,3,6,8,9,10,12 6.Dynamic data structures in Java, 2h, Learning outcomes:2,3,6,7,8,9,10,11,12 7.Generics in Java and lambda expressions, 2h, Learning outcomes:2,3,7,8,9,10,11,12,13				

8.Compensation of missed exercises, 2h, Learning outcomes:2,3,6,7,8,9,10,11,12
9.No Classes, 2h
10.Using files in Java, 2h, Learning outcomes:2,3,7,8,9,10,11,12
11.Koritenje grafig suja u Javi - jednostavne komponente, 2h, Learning outcomes:2,3,4,6,7,8,9,10,11,12
12.Using graphical user interface in Java - complex components, 2h, Learning outcomes:2,3,4,6,7,8,9,10,11,12
13.Connecting Java applications to databases, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
14.Multithreading in Java, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
15.Compensation of missed exercises, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12

Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Overhead projector
Exam literature	Bruce Eckel: On Java 8, MidView LLC, 2017. H. Schildt: Java: The Complete Reference, Ninth Edition, McGraw-Hill Osborne Media; 9 edition (March 11, 2014) Java for Programmers: Deitel Developer Series, Prentice Hall, veljača, 2009. A Programmer's Guide to Java SCJP Certification: A Comprehensive Primer 3rd Edition, 2009. Java Concurrency in Practice, Addion Wesley, svibanj, 2006. Head First Java, 2nd edition, O'Reilly, veljača, 2005. Java The Good Parts, O'Reilly, svibanj, 2010. Eclipse IDE Pocket Guide, O'Reilly, kolovoz, 2005. Effective Java, 2nd edition, Prentice Hall, svibanj, 2008. Sprechen Sie Java?, dpunkt.verlag, Hanspeter Mssenbck, lipanj 2011. Grundkurs Programieren iz Java, Hanser, 6. Auflage, 2011.
Students obligations	Solving ten laboratory exercices.
Knowledge evaluation during semester	Ten laboratory exams - 6 points each Two partial exams - 10 points each Final exam - 20 points Optional points for additional effort Every partial exam has a correctional exam Maximum 100 points 0-49 - not good enough 50-61 - sufficient 62-74 - good 75-86 - very good 87-100 - excellent
Knowledge evaluation after semester	Written exam is evalued with 40 points, and remaining 60 points are transferred from the achievement on laboratory exams during the semester time.
Student activities:	Aktivnost ECTS (Practical work) 4 (Written exam) 1
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Programiranje
ISVU equivalents:	22695;
Proposal made by	Aleksander Radovan, BSc. engineer, senior lecturer, 02.06.2018.

Code WEB/ISVU	23224/143073	ECTS	1.0	Academic year	2018/2019
Name	Kinesiology Education I				
Status	1st semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			0+30 (30+0+0+0) 0	
Teachers	Auditory exercises:1. Marko Milanović				
Course objectives	To develop in students the habit of practising sports and improving their psychophysical condition and conduct				
Learning outcomes:	1.ability to demonstrate how to perform properly technical elements of certain sports. Level: 2.ability to explain the basic terms related to certain sports. Level: 3.ability to explain the basic rules of certain sports. Level: 4.ability to recognize the muscle building exercises. Level: 5.ability to explain the importance of warming up and stretching. Level: 6.ability to describe the organisation of sport competitions. Level: 7.ability to understand the importance of daily workout throughout one's life. Level:				
Methods of carrying out auditory exercises	Other				
Course content auditory	1.Repeating technical elements of a specific kinesiologic activity, 2h, Learning outcomes:1 2.Repeating technical elements of a specific kinesiologic activity, 2h, Learning outcomes:1 3.Adopting new elements of a specific kinesiologic activity, 2h, Learning outcomes:2 4.Adopting new elements of a specific kinesiologic activity, 2h, Learning outcomes:2 5.Improving the elements of a specific kinesiologic activity, 2h, Learning outcomes:2 6.Improving the elements of a specific kinesiologic activity, 2h, Learning outcomes:2 7.Adopting a set of warm-up exercises for a specific kinesiologic activity, 2h, Learning outcomes:3 8.Adopting a set of stretching exercises for a specific kinesiologic activity, 2h, Learning outcomes:3 9.Repeating the basic rules of a specific kinesiologic activity, 2h, Learning outcomes:5 10.Using auxiliary and elementary games in the learning process of a specific kinesiologic activity, 2h, Learning outcomes:5 11.Adoption of basic technical and tactical elements of a specific kinesiologic activity, 2h, Learning outcomes:6 12.Adoption of basic technical and tactical elements of a specific kinesiologic activity, 2h, Learning outcomes:6 13.Competition and Games, 2h, Learning outcomes:4 14.Competition and Games, 2h, Learning outcomes:5 15.Training and automation of injury prevention exercises, 2h, Learning outcomes:5				
Required materials	Special equipment				
Exam literature	Basic literature: 1. M. Dodik, Tjelesna i zdravstvena kultura, Sveučilište u Rijeci, Rijeka, 1992. 2. I. Belan, Aerobik, Ivo Balen, Koprivnica, 1988. 3. I. Horvat, Pravila nogometne igre, Novinsko-izdavačko propagandno poduzeće, Zagreb, 1994. 4. I. Tocigl, Taktika igre u obrani, Novinsko-izdavačko propagandno poduzeće, Zagreb, 1989. Additional literature: 1. D. Milanović, Dopunski sadržaji sportske pripreme, Sportska tribina i Kineziološki fakultet Zagreb, Zagreb, 2002.				
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	Practical test				
Knowledge evaluation after semester	The exam is not graded but the knowledge is checked at the beginning of the new semester.				
Student activities:	Aktivnost (Practical work)		ECTS 1		
Remark	This course can not be used for final thesis theme				
Prerequisites:	No prerequisites.				
ISVU equivalents:	22745;83777;				
Proposal made by	Marko Milanović, prof.				

Code WEB/ISVU	23225/143075	ECTS	1.0	Academic year	2018/2019
Name	Kinesiology Education II				
Status	2nd semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			0+30 (30+0+0+0) 0	
Teachers	Auditory exercises:1. Marko Milanović				
Course objectives	To develop in students the habit of practising sports and improving their psychophysical condition and conduct				
Learning outcomes:	1.ability to demonstrate how to perform properly technical elements of certain sports. Level: 2.ability to organise exercises for groups of muscles. Level: 3.ability to distinguish between different types of workout carried out to achieve different motoric and functional capabilities. Level:6 4.ability to compare various body activities and their influences on anthropological features . Level:6,7 5.ability to explain the basic facts about the influence of daily workout on one's health . Level: 6.ability to distinguish between different nutrients and their effects on a body. Level:6 7.ability to explain the basic facts about the relation between workout and a body volume. Level:				
Methods of carrying out auditory exercises	Other				
Course content auditory	1.Repeating technical elements of a specific kinesiologic activity, 2h, Learning outcomes:1 2.Repeating technical elements of a specific kinesiologic activity, 2h, Learning outcomes:1 3.Adopting new elements of a specific kinesiologic activity, 2h, Learning outcomes:2 4.Adopting new elements of a specific kinesiologic activity, 2h, Learning outcomes:2 5.Adopting a set of exercises for each muscle group, 2h, Learning outcomes:3 6.Adopting a set of exercises for each muscle group, 2h, Learning outcomes:3 7.Establishing the rules of a specific kinesiologic activity, 2h, Learning outcomes:4 8.Adopting different training methods , 2h, Learning outcomes:4 9.Adopting different training methods , 2h, Learning outcomes:5 10.Implementation of the elements of various sporting activities, 2h, Learning outcomes:5 11.Training of injury prevention exercises , 2h, Learning outcomes:6 12.Adoption of basic technical and tactical elements of a specific kinesiologic activity, 2h, Learning outcomes:7 13.Adoption of basic technical and tactical elements of a specific kinesiologic activity, 2h, Learning outcomes:7 14.Competition and Games, 2h, Learning outcomes:6 15.Competition and Games, 2h, Learning outcomes:5				
Required materials	Special equipment				
Exam literature	Basic literature: 1. M. Dodik, Tjelesna i zdravstvena kultura, Sveučilište u Rijeci, Rijeka, 1992. 2. I. Belan, Aerobik, Ivo Balen, Koprivnica, 1988. 3. I. Horvat, Pravila nogometne igre, Novinsko-izdavačko propagandno poduzeće, Zagreb, 1994. 4. I. Tocigl, Taktika igre u obrani, Novinsko-izdavačko propagandno poduzeće, Zagreb, 1989. Additional literature: 1. D. Milanović, Dopunski sadržaji sportske pripreme, Sportska tribina i Kineziološki fakultet Zagreb, Zagreb, 2002.				
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	Prakti ispit#1#1#100$				
Knowledge evaluation after semester	The exam is not graded but the knowledge is checked at the beginning of the new semester.				
Student activities:	Aktivnost (Practical work)		ECTS 1		
Remark	This course can not be used for final thesis theme				
Prerequisites:	No prerequisites.				
ISVU equivalents:	22732;83778;				
Proposal made by	Marko Milanovic, prof.				

Code WEB/ISVU	23226/143076	ECTS	1.0	Academic year	2018/2019
Name	Kinesiology Education III				
Status	3rd semester - Software engineering (Redovni raarstvo) - obligatory course3rd semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			0+30 (30+0+0+0) 0	
Teachers	Auditory exercises:1. Marko Milanović				
Course objectives	To develop in students the habit of practising sports and improving their psychophysical condition and conduct				
Learning outcomes:	1.ability to demonstrate how to perform properly technical elements of certain sports. Level: 2.ability to explain the purpose of applying tactical elements in certain sports. Level: 3.ability to provide an example on how to organise a student sport competition . Level: 4.ability to group the basic kinesiological programs based on their influences on a body . Level: 5.ability to explain the possibilities of taking part in sport activities in Croatia. Level: 6.ability to provide an example on how to plan a personal workout program for a week/a month/a year. Level: 7.ability to describe how to give first aid to a person injured while doing a sport activity. Level:				
Methods of carrying out auditory exercises	Other				
Course content auditory	1.Improving the technical elements of a specific kinesiologic activity, 2h, Learning outcomes:1 2.Improving the technical elements of a specific kinesiologic activity, 2h, Learning outcomes:1 3.Establishing the rules of a specific kinesiologic activity, 2h, Learning outcomes:2 4.Establishing the rules of a specific kinesiologic activity, 2h, Learning outcomes:2 5.Improving the basic technical and tactical elements of a specific kinesiologic activity, 2h, Learning outcomes:3 6.Improving the basic technical and tactical elements of a specific kinesiologic activity, 2h, Learning outcomes:3 7.Game systems and tactics of a specific kinesiologic activity, 2h, Learning outcomes:3 8.Game systems and tactics of a specific kinesiologic activity, 2h, Learning outcomes:4 9.Team leadership, officiating, organization of competitions, 2h, Learning outcomes:4 10.Training structure (content and organization) of a specific kinesiologic activity, 2h, Learning outcomes:5 11.Learning and application of a specific kinesiologic activity for the purpose of independent regular exercise during free time., 2h, Learning outcomes:6 12.Learning and application of a specific kinesiologic 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:5 14.Strength and mobility exercises for the prevention of injuries, First aid, 2h, Learning outcomes:6 15.Basic characteristics of different kinesiologic activities and their impact on anthropological characteristics, 2h, Learning outcomes:4				
Required materials	Special equipment				
Exam literature	Basic literature: 1. M. Dodik, Tjelesna i zdravstvena kultura, Sveučilište u Rijeci, Rijeka, 1992. 2. I. Belan, Aerobik, Ivo Balen, Koprivnica, 1988. 3. I. Horvat, Pravila nogometne igre, Novinsko-izdavačko propagandno poduzeće, Zagreb, 1994. 4. I. Tocigl, Taktika igre u obrani, Novinsko-izdavačko propagandno poduzeće, Zagreb, 1989. Additional literature: 1. D. Milanović, Dopunski sadržaji sportske pripreme, Sportska tribina i Kineziološki fakultet Zagreb, Zagreb, 2002.				
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	Prakti ispit#1#1#100$				
Knowledge evaluation after semester	The exam is not graded but the knowledge is checked at the beginning of the new semester.				
Student activities:	Aktivnost (Practical work)		ECTS 1		
Remark	This course can not be used for final thesis theme				
Prerequisites:	No prerequisites.				
ISVU equivalents:	22736;83779;				
Proposal made by	Marko Milanovic, prof.				

Code WEB/ISVU	23227/143077	ECTS	1.0	Academic year	2018/2019
Name	Kinesiology Education IV				
Status	4th semester - Software engineering (Redovni raarstvo) - obligatory course4th semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home				0+30 (30+0+0+0) 0
Teachers	Auditory exercises:1. Marko Milanović				
Course objectives	To develop in students the habit of practising sports and improving their psychophysical condition and conduct				
Learning outcomes:	1.ability to demonstrate how to perform properly technical elements of certain sports. Level: 2.ability to explain the purpose of applying tactical elements in certain sports. Level: 3.ability to explain how to take part in student sport competitions organisation. Level: 4.ability to explain the importance of taking proper food and carrying out daily workout throughout one's life. Level: 5.ability to provide an example on how to plan a personal workout program for a week/a month/a year. Level: 6.ability to distinguish between different professional illnesses of the locomotor system of persons employed in civil engineering. Level:6 7.ability to explain the importance of one's being physically active and thus preventing professional illnesses of the locomotor system. Level:				
Methods of carrying out auditory exercises	Other				
Course content auditory	1.Adopting and improving the technical elements of a chosen kinesiologic activity, 2h, Learning outcomes:1 2.Adopting and improving the technical elements of a chosen kinesiologic activity, 2h, Learning outcomes:1 3.Improving the technical and tactical elements of a specific kinesiologic activity, 2h, Learning outcomes:2 4.Improving the technical and tactical elements of a specific kinesiologic activity, 2h, Learning outcomes:2 5.Establishing the rules of a specific kinesiologic activity, 2h, Learning outcomes:3 6.Establishing the rules of a specific kinesiologic activity, 2h, Learning outcomes:3 7.Analysis and methods of teaching a specific kinesiologic activity, 2h, Learning outcomes:4 8.Application of a specific kinesiologic activity for the purpose of independent regular exercise during free time., 2h, Learning outcomes:4 9.Application of a specific kinesiologic activity for the purpose of independent regular exercise during free time., 2h, Learning outcomes:5 10.Team leadership, officiating, organization of competitions, 2h, Learning outcomes:5 11.Training structure (content and organization) of a specific kinesiologic activity, 2h, Learning outcomes:6 12.Training structure (content and organization) of a specific kinesiologic activity, 2h, Learning outcomes:6 13.Selection of exercises for each muscle group for the prevention of occupational injuries, 2h, Learning outcomes:7 14.Basic characteristics of different kinesiologic activities and their impact on anthropological characteristics, 2h, Learning outcomes:7 15.Basic characteristics of different kinesiologic activities and their impact on anthropological characteristics, 2h				
Required materials	Special equipment				
Exam literature	Basic literature: 1. M. Dodik, Tjelesna i zdravstvena kultura, Sveučilište u Rijeci, Rijeka, 1992. 2. I. Belan, Aerobik, Ivo Balen, Koprivnica, 1988. 3. I. Horvat, Pravila nogometne igre, Novinsko-izdavačko propagandno poduzeće, Zagreb, 1994. 4. I. Tocigl, Taktika igre u obrani, Novinsko-izdavačko propagandno poduzeće, Zagreb, 1989. Additional literature: 1. D. Milanović, Dopunski sadržaji sportske pripreme, Sportska tribina i Kineziološki fakultet Zagreb, Zagreb, 2002.				
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	Prakti ispit#1#1#100$				
Knowledge evaluation after semester	The exam is not graded but the knowledge is checked at the beginning of the new semester.				
Student activities:	Aktivnost (Practical work)		ECTS 1		
Remark	This course can not be used for final thesis theme				
Prerequisites:	No prerequisites.				
ISVU equivalents:	22716;83780;				
Proposal made by	Marko Milanović, prof.				

Code WEB/ISVU	22969/22742	ECTS	7.0	Academic year	2018/2019
Name	Mathematics I				
Status	1st semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+45 (45+0+0+0) 135	
Teachers	Lectures:1. Tihana Strmečki Auditory exercises: Tihana Strmečki				
Course objectives	To enable students to solve mathematical problems related to engineering practice				
Learning outcomes:	1.ability to calculate the value of units containing basic arithmetic operations consisting of complex numbers. Level:6 2.ability to draw the position of a complex number in gaussian plane. Level:6 3.ability to calculate the determinants and simple matrix units. Level:6 4.ability to calculate vector units. Level:6 5.ability to solve linear equations . Level:6 6.ability to understand the definition and composition of a function; to understand inverse functions. Level:6,7 7.ability to classify functions: even functions/odd functions, injections/surjections/bijections. Level:6,7 8.ability to classify basic types of elementary function: exponential functions, polynomials, logarithm functions. Level:6,7 9.ability to sketch graphs of polynomials, trigonometric functions and rational functions without using derivatives. Level:6 10.ability to calculate the limit of a function. Level:6 11.ability to calculate the derivative of a function. Level:6 12.ability to sketch function graphs by means of derivatives and critical points. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other The chalkboard lectures include theory and many examples clearly analyzed step by step, in cooperation with students.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other Exercises are solved on the blackboard in cooperation with students.				
Course content lectures	1.Complex numbers, algebraic and trigonometric form, basic arithmetic operations with complex numbers (addition, subtraction, multiplication, division, raising to an integer power, and taking roots (fractional power)), Gauss plane, 2h, Learning outcomes:1,2 2.Determinant (2nd order - by formula, 3rd order - by rule of Sarrus and Laplaces expansion, 4th order - by Laplaces expansion nad using elementary transformations), 2h, Learning outcomes:3,5 3.System of linear equations, solving by Cramers rule and by Gauss-Jordan elimination method , 2h, Learning outcomes:5 4.Vectors, 2h, Learning outcomes:4,5 5.Functions, definition, domain, range, codomain, injection, surjection, bijection, graph, increasing and decreasing functions, monotonicity, composition, inverse, even and odd functions, 2h, Learning outcomes:6,7 6.Elementary functions: power functions, polynomials, exponential functions, logarithmic functions, trigonometric functions, hyperbolic functions, 2h, Learning outcomes:6,7,8 7.1. exam, 2h, Learning outcomes:1,2,3,4,5,6,7,8 8.Limit, sequence, 2h, Learning outcomes:10 9.Sketching graphs of some functions (polynomials, trigonometric functions), 2h, Learning outcomes:9 10.Problem of finding a tangent, derivative of function, rules for derivative of a sum, product and quotient of two functions, 2h, Learning outcomes:9,12 11.Differential, implicit differentiation, parametric differentiation, 2h, Learning outcomes:10,11 12.Derivative of composite function, derivative of function f(x)=x^x, 2h, Learning outcomes:11 13.LHopitals rule, 2h, Learning outcomes:11 14.Taylor polinomial of a function centered at zero, 2h, Learning outcomes:11 15.2. exam, 2h, Learning outcomes:9,10,11,12				
Course content auditory	1.Complex numbers, algebraic and trigonometric form, basic arithmetic operations with complex numbers (addition, subtraction, multiplication, division, raising to an integer power, and taking roots (fractional power)), Gauss plane, 3h, Learning outcomes:1,2 2.Determinant (2nd order - by formula, 3rd order - by rule of Sarrus and Laplaces expansion, 4th order - by Laplaces expansion and using elementary transformations), 3h, Learning outcomes:3,5 3.System of linear equations, solving by Cramers rule and by Gauss-Jordan elimination method , 3h, Learning outcomes:6 4.Vectors, 3h, Learning outcomes:4,5 5.Functions, definition, domain, range, codomain, injection, surjection, bijection, graph, increasing and decreasing functions, monotonicity, composition, inverse, even and odd functions, 3h, Learning outcomes:6,7 6.Elementary functions: power functions, polynomials, exponential functions, logarithmic functions, trigonometric functions, hyperbolic functions, 3h, Learning outcomes:6,7,8 7.1. exam, 3h, Learning outcomes:1,2,3,4,5,6,7,8 8.Limit, sequence, 3h, Learning outcomes:10 9.Sketching graphs of some functions (polynomials, trigonometric functions), 3h, Learning outcomes:9 10.Problem of finding a tangent, derivative of function, rules for derivative of a sum, product and quotient of two functions, 3h, Learning outcomes:9,12 11.Differential, implicit differentiation, parametric differentiation, 3h, Learning outcomes:10,11 12.Derivative of composite function, derivative of function f(x)=x^x, 3h, Learning outcomes:11 13.LHopitals rule, 3h, Learning outcomes:11 14.Taylor polinomial of a function centered at zero, 3h, Learning outcomes:11				

	15.2. exam, 3h, Learning outcomes:9,10,11,12
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Special equipment Some of the problems are solved using the appropriate software Mathematica.
Exam literature	Basic literature: 1. P. Javor: Uvod u matematičku analizu, Školska knjiga, Zagreb, 1983. 2. S. Suljagić: Matematika I, skripta, Zagreb, 2005 3. I. Slapničar: Matematika 1, skripta, Split, 2002. 4. B. P. Deminovič: Zadaci i rješeni primjeri iz više matematike, Danjar, Zagreb, 1995. 5. N. Elezović: Linearna algebra, Element, Zagreb, 1995. Additional literature: 1. L. Krnić, Z. Šikić: Račun diferencijalni i integralni, I dio, Školska knjiga, Zagreb, 1992. 2. V. Devide: Riješeni zadaci iz više matematike, svezak i i II, Školska knjiga, Zagreb, 1985. 3. T. Bradić, R. Roki, J. Pečarić, M. Strunje: Matematika za tehničke fakultete, Multigraf, Zagreb, 1994.
Students obligations	No special requirements
Knowledge evaluation during semester	Two exams during semester Ratings by the outcome: maximum 100 points 50-62 sufficient (2) 63-75 good (3) 76-88 very good (4) 89-100 excellent (5)
Knowledge evaluation after semester	Written exam 60% of mark Ratings of written part of the exam: maximum 100 points 50-62 sufficient (2) 63-75 good (3) 76-88 very good (4) 89-100 excellent (5) Oral exam 40% of mark
Student activities:	Aktivnost .... ECTS (Written exam) 7
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
Proposal made by	dipl.ing.mat Tihana Strmečki., 19.05.2016.

Code WEB/ISVU	22967/22730	ECTS		7.0	Academic year	2018/2019
Name	Mathematics II					
Status	2nd semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course					
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home				30+45 (45+0+0+0) 135	
Teachers	Lectures:1. Tihana Strmečki Auditory exercises: Tihana Strmečki					
Course objectives	To enable students to solve mathematical problems related to engineering practice.					
Learning outcomes:	1.ability to calculate primitive functions - indefinite integrals . Level:6 2.ability to calculate definite integrals. Level:6 3.ability to calculate improper integrals. Level:6 4.ability to calculate integrals by using numerical methods. Level:6 5.ability to solve basic types of differential equations. Level:6 6.ability to solve differential equations by using Laplace transformation. Level:6 7.ability to solve differential equations by using numerical methods . Level:6					
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion Questions and answers Other The chalkboard lectures include theory and many examples clearly analyzed step by step, in cooperation with students.					
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other Exercises are solved on the blackboard in cooperation with students.					
Course content lectures	1.Indefinite integrals, primitive function, basic integrals, 2h, Learning outcomes:1 2.Solving indefinite integrals by substitution and using partial fractions, 2h, Learning outcomes:1 3.Solving indefinite integrals by integration by parts, by completing the square of second degree trinomial, 2h, Learning outcomes:1 4.Definite integrals, Newton-Leibnizs formula, Mid value theorem for integrals, 2h, Learning outcomes:1,2 5.Improper integrals, trigonometry and hyperbolic supstitutions, 2h, Learning outcomes:1,2 6.Application of definite integrals: areas of plane figures, the arc length of a curve, volumes of solids and areas of surfaces of revolution, 2h, Learning outcomes:1,2,3 7.Numerical methods of calculating definite integrals, 2h, Learning outcomes:1,2,3,4 8.1. exam, 2h, Learning outcomes:1,2,3 9.Ordinary differential equations - introduction, 2h, Learning outcomes:5 10.First order ODE with separable variables, homogenous ODEs, 2h, Learning outcomes:5 11.Solving ODEs by variable substitution (homogeneous diff. eqs., ode of form y=f(ax+by+c)), 2h, Learning outcomes:5 12.Linear ODEs, homogenous and nonhomogenous, variation of constant method, integrating factor method, 2h, Learning outcomes:5 13.Linear ODEs of second order with constant coefficients, homogenous and nonhomogenous, 2h, Learning outcomes:5 14.Solving ODEs by Laplaces transformation; Numerical methods of solving ODEs, 2h, Learning outcomes:5,6,7 15.2. exam, 2h, Learning outcomes:5,6,7					
Course content auditory	1.Indefinite integrals, primitive function, basic integrals, 3h, Learning outcomes:1 2.Solving indefinite integrals by substitution, and using partial fractions, 3h, Learning outcomes:1 3.Solving indefinite integrals by integration by parts, by completing the square of second degree trinomial, 3h, Learning outcomes:1 4.Definite integrals, Newton-Leibnizs formula, 3h, Learning outcomes:1,2 5.Improper integrals, trigonometry and hyperbolic supstitutions, 3h, Learning outcomes:1,2 6.Application of definite integrals: the areas of plane figures, the arc length of a curve, volumes of solids and areas of surfaces of revolution, 3h, Learning outcomes:1,2,3 7.Numerical methods of calculating definite integrals, 3h, Learning outcomes:1,2,3,4 8.1. exam, 3h, Learning outcomes:1,2,3,4 9.Ordinary differential equations - introduction, 3h, Learning outcomes:5 10.First order ODE with separable variables, 3h, Learning outcomes:5 11.Solving ODEs by variable substitution (homogeneous diff. eqs., ode of form y=f(ax+by+c)), 3h, Learning outcomes:5 12.Linear ODEs, homogenous and nonhomogenous, variation of constant method, integrating factor method, 3h, Learning outcomes:5 13.Linear ODEs of second order with constant coefficients, homogenous and nonhomogenous, 3h, Learning outcomes:5 14.Solving ODEs by Laplaces transformation; Numerical methods of solving ODEs, 3h, Learning outcomes:6,7 15.2. exam, 3h, Learning outcomes:5,6,7					
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Special equipment Some of the problems are solved using the appropriate software Mathematica.					
Exam literature	Basic literature: 1. P. Javor: Uvod u matematičku analizu, Školska knjiga, Zagreb, 1983. 2. S. Suljagić: Matematika II, skripta, Zagreb, 2006. 3. I. Slapničar: Matematika 2, skripta, Split, 2008. 4. B. P. Deminovič: Zadaci i rješeni primjeri iz više matematike, Danjar, Zagreb, 1995. Additional literature: 1. L. Krnić, Z. Šikić: Račun diferencijalni i integralni, I dio, Školska knjiga, Zagreb, 1992. 2. I. Ivanšić: Fourierov red i integral, diferencijalne jednadžbe, skripta, FER, Zagreb, 1997. 3. T. Bradić, R. Roki, J. Pečarić, M. Strunje: Matematika za tehničke fakultete, Multigraf, Zagreb, 1994.					

Students obligations	No special requirements.
Knowledge evaluation during semester	Two exams during semester Ratings by the outcome: maximum 100 points 50-62 sufficient (2) 63-75 good (3) 76-88 very good (4) 89-100 excellent (5)
Knowledge evaluation after semester	Written exam 60% of mark Ratings of written part of the exam: maximum 100 points 50-62 sufficient (2) 63-75 good (3) 76-88 very good (4) 89-100 excellent (5) Oral exam 40% of mark
Student activities:	Aktivnost ECTS (Written exam) 7
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
Proposal made by	dipl.ing.mat Tihana Strmečki., 19.05.2016.

Code WEB/ISVU	22965/22720	ECTS	5.0	Academic year	2018/2019
Name	Network Services				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			15+45 (0+45+0+0) 90	
Teachers	Lectures:1. Ognjen Mitrović struč. spec. ing. techn. inf., pred. Lectures:2. dr.sc. Željko Širanović prof.v.š. Laboratory exercises: Ognjen Mitrović struč. spec. ing. techn. inf., pred. Laboratory exercises:dr.sc. Željko Širanović prof.v.š. Laboratory exercises: Vedran Tadić struč.spec.ing.techn.inf.				
Course objectives	To introduce students to the basic knowledge and skills related to configuration, administration and maintenance of basic network services, applications and computer systems				
Learning outcomes:	1.ability to plan and control the network VPN and WiFi access. Level:6,7 2.ability to plan and configure the network traffic security by means of the IPSec network service. Level:6,7 3.ability to manage and control the DNS service dissolution on a server. Level:6,7 4.ability to create a computer name dissolution system in computer networks by using the available server tools. Level:6,7 5.ability to plan a computer name dissolution in LANs by means of the DNS network service. Level:6,7 6.ability to manage and control the DHCP network service by means of the available server tools. Level:6,7 7.ability to plan the IP addressing of hosts in a LAN by means of the DHCP network service. Level:6,7 8.ability to create a service for routing the network traffic by means of the RAS network service . Level:6,7 9.ability to plan the security policy of an Intranet connected to the Internet. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Discussion Questions and answers				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations Computer simulations Interactive problem solving Workshop Other				
Course content lectures	1.Overview of network services and applications, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 2.The need for standardization of network services, 1h, Learning outcomes:1,2,3,4,5,6,7,8 3.Static and dynamic allocation of IP addresses, 1h, Learning outcomes:7,9 4.Static and dynamic allocation of IP addresses, 1h, Learning outcomes:6,7,9 5.I. Colloquium, 1h, Learning outcomes:6,7,9 6.Host name resolution , 1h, Learning outcomes:4,5 7.Host name resolution , 1h, Learning outcomes:3,4,5 8.directory service, 1h, Learning outcomes:3,4,5 9.Remote Access Services, 1h, Learning outcomes:1,8 10.Remote Access Services, 1h, Learning outcomes:1,8,9 11.Data transmission services, 1h, Learning outcomes:1,8,9 12.Data transmission services, 1h, Learning outcomes:1,8,9 13.Data transmission services - VPN, 1h, Learning outcomes:1,2,8,9 14.Messaging services, 1h, Learning outcomes:1,2,9 15.IP security services, 1h, Learning outcomes:1,2,8,9				
Course content laboratory	1.Settings Dynamic Host Configuration protocol - DHCP, 3h, Learning outcomes:6,7 2.Monitoring DHCP service , 3h, Learning outcomes:6,7 3.Configuration names resolution services - DNS, 3h, Learning outcomes:3,4,5 4.Monitoring names resolution services - DNS, 3h, Learning outcomes:3,4,5 5.VPN connection, 3h, Learning outcomes:1,8,9 6.Configuring dial-up remote access , 3h, Learning outcomes:1,8,9 7.Configuring wireless access , 3h, Learning outcomes:1,8,9 8.Network security traffic -IPSec, 3h, Learning outcomes:2,8,9 9.Network security traffic -IPSec , 3h, Learning outcomes:2,8,9 10.II. Colloquium , 3h, Learning outcomes:1,3,4,5,6,7 11.Configuration of data transfer services FTP, HTTP, POP, SMTP, IMAP, 3h, Learning outcomes:9 12.Configuration of data transfer services FTP, HTTP, POP, SMTP, IMAP, 3h, Learning outcomes:9 13.Configuration of data transfer services FTP, HTTP, POP, SMTP, IMAP, 3h, Learning outcomes:9 14.Configuring security mechanisms for access to network, 3h, Learning outcomes:2,8,9 15.III. Colloquium , 3h, Learning outcomes:2,8,9				
Required materials	Basic: classroom, blackboard, chalk... Special purpose laboratory Special purpose computer laboratory Whiteboard with markers Overhead projector				

Exam literature	1. J.C. Mackin, T. Northrup: Configuring Windows Server 2008 Network Infrastructure, Microsoft Press, 2008. 2. B. Sosinsky: Networking Bible, Wiley Publishing, Inc.,2009. Additional literature: 1. Douglas E. Comer: Computer Networks and Internets, Prentice Hall, 2009. 2. L. Parziale, D.T. Britt, C. Davis, J. Forrester, W. Liu, C. Matthews, N. Rosselot: TCP/IP Tutorial and Technical Overview (IBM Redbooks), IBM Corporation, 2006. (http://ibm.com/redbooks)
Students obligations	maximum of 3 absences from exercises
Knowledge evaluation during semester	Redovitost pohaa#6#5#0$Kolokvij, numeri zadaci#3#25#60$Kolokvij, teorijska pitanja#3#25#60$Prakti rad#10#35#60$Prakti ispit#1#10#60$
Knowledge evaluation after semester	written and oral exams, seminar work
Student activities:	Aktivnost ECTS (Written exam) 5
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have completed Računalne mreže
Proposal made by	dr.sc. Željko Širanović

Code WEB/ISVU	23047/81892	ECTS	7.0	Academic year	2018/2019
Name	Object Oriented Programming				
Status	2nd semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 150	
Teachers	Lectures:1. Prof. dr. sc. Miroslav Slamić profesor visoke škole Laboratory exercises: Ivan Cesar mag. ing. Laboratory exercises: Željko Kovačević , struč.spec.ing.techn.inf. Laboratory exercises: Martina Petrovečki struč.spec.ing.techn.inf. Laboratory exercises:Prof. dr. sc. Miroslav Slamić profesor visoke škole Laboratory exercises:Dr. sc. Aleksandar Stojanović pred.				
Course objectives	To transfer to students the basic principles of the OO paradigm and the knowledge of C++ which will enable them to handle successfully other programs in engineering practice				
Learning outcomes:	1. ability to identify fundamental differences between procedural and object-oriented paradigm and understand the basic features of objects. Level:6 2.ability to to form a class based on the definition of the properties and behavior of the object. Level:6 3.ability to give a software solution in C++ by means of classes and by using a paradigm developed by OOP. Level:6 4.ability to devise operators in C++ based classes. Level:6,7 5.ability to design an OOP based solution by using templates from STL C++ libraries. Level:6 6.ability to create one's own class and function templates in solving OOP based problems. Level:6,7 7.ability to distinguish between OOP languages (C++, C#, Java). Level:6 8.ability to relate the knowledge gained in basic OO paradigms to different solutions to API classes in C++ for developing a GUI. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Discussion				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment				
Course content lectures	1.History and concept of the OO paradigm. C++ as opposed to C. Advantages of the OO paradigm, 2h, Learning outcomes:1 2.U/I in C++ and other specific features of the C++ syntax, 2h, Learning outcomes:1 3. Object, object model, properties and behaviour of objects , 2h, Learning outcomes:1 4.Classes, instances, access permission, public interface, 2h, Learning outcomes:1,2 5. Constructor, destructor, functions, function overload.Static and dynamic object instances (new and delete operators), 2h, Learning outcomes:2,3,7 6.Copying of objects, copy constructor, associating objects., 2h, Learning outcomes:2,3,7 7. Constant members and objects. References. Friend functions, 2h, Learning outcomes:2,3,7 8.Operators overloading., 2h, Learning outcomes:3,4,7 9.Inheritance, deklaration, implementation of classes, the rights issued by inheritance., 2h, Learning outcomes:3,4,7 10.Access to functions, ancestors, overload. Rules for the constructor in a class, 2h, Learning outcomes:3,4,7 11.Polymorphism., 2h, Learning outcomes:3,4,7 12.Virtual member functions, virtual classes , 2h, Learning outcomes:3,4 13.Function templates and class templates., 2h, Learning outcomes:3,6,7 14.Use of the STL library. Use of templates., 2h, Learning outcomes:3,5,6,7 15.Solving the exceptions. Editing a named space. Carrying out a project by means of MFC classes , 2h, Learning outcomes:3,4,5,6,7,8				
Course content laboratory	1.The preparation practice for introduction to C + + and specific features I / O access., 2h, Learning outcomes:1 2.Introduction to work on exercises using Moodle LMS and tool for automatic evaluation of software solutions., 2h, Learning outcomes:1 3.Exercise 1: Object classes, attributes, 2h, Learning outcomes:1,2 4.Exercise 2: Methods, constructor, destructor, 2h, Learning outcomes:1,2 5.Exercise 3: Access modifiers, types of functions, passing arguments to the function, 2h, Learning outcomes:1,2 6.Exercise 4: : Copy constructor, assignment operator, 2h, Learning outcomes:1,2,7 7.Exercise 5: Friend functions, const. restrictions, 2h, Learning outcomes:1,2,7 8.The first mid-term exam., 2h, Learning outcomes:1,2 9.Exercise 6: Operator overloading, 2h, Learning outcomes:2,3,4 10.Exercise 7: Inheritance, 2h, Learning outcomes:3,4,7 11.Exercise 8: Polymorphism, 2h, Learning outcomes:4,5,7 12.Exercise 9: Templates. Using STL., 2h, Learning outcomes:4,5,6,7 13.Exercise 10: Namespace, exception, 2h, Learning outcomes:3,4,5,6,7 14.Preparation for second mid-term., 2h, Learning outcomes:1,2,3,4,5,6,7,8 15.The second mid-term., 2h, Learning outcomes:1,2,3,4,5,6,7,8				
Required materials	General purpose computer laboratory Whiteboard with markers Overhead projector				
Exam literature	Basic literature: 1. M. Slamić: Elektronički sadržaji predavanja (PPT prezentacije) na web stranici predmeta na Tehničkom veleučilištu u Zagrebu, 2012., www.tvz.hr. 2. Boris Motik,Julijan Šribar:Demistificirani C++,treće dopunjeno izdanje,m Zagreb, Element , 2010. Additional literature: 3. D. Radošević, Programiranje 2, TIVA Tiskara Varaždin, 2007.				

	4. Eckel Thinking in C++ Vol 1 i Vol 2, Prentice Hall, 2003. http://www.mindview.net/Books/TICPP/ThinkingInCPP2e.html 5. Stroustrup The C++ Programming Language, Addison-Wesley, Third edition, 2004. 6. Željko Kovačević, C++ Analiza i primjena, Školska knjiga, 2004.
Students obligations	The presence of the exercises 80%. Presence in classes 70%.
Knowledge evaluation during semester	The course is rated a total of 100 points . Way of acquiring points is as follows : first mid-term - solving tasks on the computer and test : max . 30 points second mid-term - solving tasks on the computer and test : max . 30 points laboratory exercises : max . 40 points Points for laboratory exercises : Each exercise is scored with 10 bodova. Zbroj all points will be scaled to 40 points . - 2 points for the preparation of the performed exercises If you do the first two prepare for it gets 0 points, and for each subsequent preparation needs to be done is removed by 1 point . Rewrite tasks preparation is punishable with negative points (a system for evaluating the task of preparing checks automatically plagiarism solutions) . - 5 points for a solution to the problem in exercises - 3 points for a test that is handled in the system MOODLE Based on the points score is determined as follows : 90.01 to 100.00 points : excellent (5) 80.01-90.00 points : very good (4) 65.01-80.00 points : good (3) 55.01-65.00 points : sufficient (2) Each learning outcome must be accomplished with a minimum of 50 % .
Knowledge evaluation after semester	The course is rated a total of 100 points . Way of gaining points is as follows : Written exam - solving tasks on the computer and test . max . 60 points Laboratory: max . 40 points Points for laboratory exercises : Each exercise is scored with 10 bodova.ZBroj all points will be scaled to 40 points . - 2 points for the preparation of the performed exercises Based on the points score is determined as follows : 90.01 to 100.00 points : excellent (5) 80.01-90.00 points : very good (4) 65.01-80.00 points : good (3) 55.01-65.00 points : sufficient (2)
Student activities:	Aktivnost ECTS (Written exam) 3 (Oral exam) 2 (Practical work) 2
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have completed Programiranje
ISVU equivalents:	22650;75228;
Proposal made by	Dr. sc. Miroslav Slamić prof. vis. šk.,15.4.2014

Code WEB/ISVU	23107/111724	ECTS	5.0		Academic year	2018/2019
Name	Open Development Platforms for Embedded Systems					
Status	4th semester - Software engineering (Redovni raarstvo) - elective course4th semester - Computer systems and network engineering (Redovni raarstvo) - elective course					
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home				15+30 (0+30+0+0) 105	
Teachers	Lectures:dr.sc.rač. Davor Cafuta , prof.v.šk. Lectures:dr.sc.rač. Ivica Dodig , prof.v.š. Laboratory exercises:dr.sc.rač. Davor Cafuta , prof.v.šk. Laboratory exercises:dr.sc.rač. Ivica Dodig , prof.v.š.					
Course objectives	To qualify students to build a fast prototype of an embedded system					
Learning outcomes:	1.to formulate the purpose and possibilities of using embedded systems . Level:6,7 2.to design an embedded system and formalise the needs for it, depending on a task . Level:6 3.to analyse a methodology used in the design of an embedded system. Level:6 4.to design the hardware section of an embedded system. Level:6,7 5.to develop a prototype of an embedded system in both the hardware and software sections. Level:6,7 6.to integrate the censors and environment necessary for the proper operation of an embedded . Level:6,7 7.to test the proper operation of an embedded system. Level:6 8.to generalise the possibility of a design for the entire production. Level:6,7 9.to write proper documentation of the solution. Level:6,7					
Methods of carrying out lectures	Case studies Demonstration Simulations					
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Other Specific equipment					
Course content lectures	1.Bools algebra, 1h, Learning outcomes:1 2.Microcontrollers, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 3.Input/output device, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 4.Display, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 5.Complex input/output solutions, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 6.Analog inputs, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 7.Partial exam, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 8.I2C, OneWire interface, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 9.RTC-Real time clock, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 10.Sensors: distance, light, IR, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 11.Sensors: temeprature, virbration, water level, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 12.Sensors: gyroscope, PIR, receiver/tranceiver, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 13.Output devices: relay, motor, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 14.SPI interface, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9 15.Final exam, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9					
Course content laboratory	1.No exercises 2.Simple program, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 3.LED, Joystick, Capacitive touch, keyboard, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 4.Display, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 5.Complex program, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 6.Linear potenciometer, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 7.No exercises 8.Temperature sensor., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 9.RTC, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 10.Sensors, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 11.Sensors, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 12.Sensors, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 13.Relay, MOC, Motor, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 14.RFID SPI, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9 15.No exercises					
Required materials	Basic: classroom, blackboard, chalk... Special purpose laboratory General purpose computer laboratory Operating supplies					
Exam literature	1. http://arduino.cc 2. Morgolis M., Arduino Cookbook 2nd edition, O'Reilly media,2011.					
Students obligations	maximum of 2 absences from exercises.					
Knowledge evaluation during semester	Partial and final practical exam.					
Knowledge evaluation after semester	Final practical exam and oral exam.					

Student activities:	Aktivnost	ECTS
	(Written exam)	5
Remark	This course can be used for final thesis theme	
Prerequisites:	Students cannot enroll in this course unless they have passed Operacijski sustavi Students cannot enroll in this course unless they have passed Arhitektura računala	
Proposal made by	v.pred. Davor Cafuta ,dipl.ing.rač. v.pred. Ivica Dodig ,dipl.ing.rač, 10.01.2014	

Code WEB/ISVU	22968/22735	ECTS	6.0	Academic year	2018/2019
Name	Operating Systems				
Status	3rd semester - Software engineering (Redovni raarstvo) - obligatory course3rd semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 120	
Teachers	Lectures:1. dr.sc.rač. Davor Cafuta , prof.v.šk. Lectures:2. dr.sc.rač. Ivica Dodig , prof.v.š. Laboratory exercises:1. dr.sc.rač. Davor Cafuta , prof.v.šk. Laboratory exercises:2. dr.sc.rač. Ivica Dodig , prof.v.š.				
Course objectives	Understand and learn how to use the functionality of a modern operating system.				
Learning outcomes:	1.ability to extract the basic elements of a computer in FN model. Level:6 2.ability to distinguish between a subprogram and a basic program, their functions as well. Level:6 3.ability to analyse the interruptions and interruptions routines; to distinguish between interruptions and exceptions. Level:6 4.ability to categorize the conditions of certain processes and their implementation. Level:6 5.ability to distinguish between a thread and a process, their advantages and disadvantages as well. Level:6 6.ability to write a program which solves the problem of one or more threads. Level:6,7 7.ability to compare the forced and unforced algorithms to organise the work of a processor. Level:6,7 8.ability to distinguish between different algorithms for loading auxiliary memory. Level:6 9.ability to calculate the size of a disk by means of basic parameters and compare the strategies of positioning the disk head. Level:6 10.ability to check which RAID field is used in assembling disks. Level:6 11.ability to analyse security aspects of the computer system. Level:6 12.ability to identify scheduling algorithms in multimedia system. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Discussion Questions and answers				
Methods of carrying out laboratory exercises	Group problem solving Computer simulations				
Course content lectures	1.Operating system components , 2h, Learning outcomes:1 2.Input/output operations, 2h, Learning outcomes:1,2 3.Interrupt handling , 2h, Learning outcomes:1,3 4.Task, process and thread. Synchronisation ., 2h, Learning outcomes:1,2,4,5 5.Mutual exclusion in single and multiprocessor systems., 2h, Learning outcomes:4,5,6 6.Job scheduling, 2h, Learning outcomes:4,5,7 7.Operating system kernel. Semaphores. Producer and consumer problem. Deadlock., 2h, Learning outcomes:4,5,7 8.Partial exam., 2h, Learning outcomes:1,2,3,4,5,6,7 9.Paging., 2h, Learning outcomes:8 10.File system., 2h, Learning outcomes:8,9,10 11.Multimedia in operating system., 2h, Learning outcomes:12 12.Security., 2h, Learning outcomes:11 13.Multiprocessor system., 2h, Learning outcomes:1,4,5 14.Vitualization., 2h, Learning outcomes:1,11 15.Final exam, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12				
Course content laboratory	1.No exercises, 2h 2.No exercises, 2h 3.Interrupts, 2h, Learning outcomes:1,3 4.No exercises, 2h 5.CPU scheduling algoritms., 2h, Learning outcomes:1,2,4,5 6.No exercises, 2h 7.No exercises, 2h 8.No exercises, 2h 9.Paging, 2h, Learning outcomes:8 10.No exercises, 2h 11.Disk reading management algorithms., 2h, Learning outcomes:8,9,10 12.No exercises, 2h 13.Multimedia algorithms, 2h, Learning outcomes:12 14.No exercises, 2h 15.No exercises, 2h				
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector				
Exam literature	Basic literature: 1. Silberschatz, S. Galvin, Operating System Concepts, Addison Wesley Publishing Company, Reading, Mass., forth edition, 1994. 2. Budin, Operacijski sustavi, Izdavač Element, Zagreb, 2000.				

	Additional literature: 1. A Tanenbaum: Modern Operating Systems, Prentice Hall, 2001
Students obligations	Positive number of points from laboratory exercises. All other informations is in repository on course page.
Knowledge evaluation during semester	Partial and final exam. One of the exam can be repeated in case of weak results. All other informations is in repository on course page.
Knowledge evaluation after semester	Written and oral exam. Number of points from laboratory exercises are used in mark calculation. All other informations is in repository on course page.
Student activities:	Aktivnost ECTS (Written exam) 6
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Programiranje
Proposal made by	Davor Cafuta , Ivica Dodig (10.01.2014)

Code WEB/ISVU	23368/154955	ECTS	7.0	Academic year	2018/2019
Name	Physics				
Status	1st semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			45+30 (30+0+0+0) 135	
Teachers	Lectures:1. Alemka Knapp Lectures:2. prof.vis.šk. Ivica Levanat Auditory exercises: Alemka Knapp Auditory exercises: Diana Šaponja-Milutinović dipl.ing.fizike, pred.				
Course objectives	To introduce students to phenomena in Physics and values that can be used in the study programme in computing, in a broader sense of the laws of Physics				
Learning outcomes:	1.ability to make simple calculations of linear motions, motions on a circle, and a launch at an angle. Level:6 2.ability to analyse kinematic values of motions on a curve. Level:6 3.ability to calculate the translation acceleration of a body upon which a force is exerted; to calculate simple examples of angle acceleration . Level:6 4.ability to relate the work of forces to kinetic and potential energy of a body. Level:6,7 5.ability to distinguish between a classical mechanical description of motion and special relativity. Level:6 6.ability to analyse harmonic oscillation without damping. Level:6 7.ability to distinguish between basic thermodynamic values; to distinguish between different mechanisms of heat transfer. Level:6 8.ability to relate Bohr's model of atom to a quality description of electron shells and ribbons. Level:6,7 9.ability to make simple calculations of emission/absorption of photons and photoelectric effect. Level:6 10.ability to relate the knowledge about the design of an atomic core containing radioactive features. 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.				
Course content lectures	1.Physical quantities and units., 2h, Learning outcomes:1,2 Polynomial derivative., 1h, Learning outcomes:1,2 2.Polynomial integration, definite integral., 1h, Learning outcomes:1,2 Rectilinear motion, free fall., 2h, Learning outcomes:1 3.Motion along curve and circle., 3h, Learning outcomes:1,2 4.Newton axioms, momentum, 3h, Learning outcomes:3 5.Work, power and energy., 3h, Learning outcomes:4 6.Rigid body rotation., 3h, Learning outcomes:2,3 7.Motion in gravitational field., 3h, Learning outcomes:5 8.Relativity of motion, inertial forces., 2h, Learning outcomes:6 The absolute and greatest speed c., 1h, Learning outcomes:6 9.Einstein special theory of relativity., 3h, Learning outcomes:6 10.Harmonic oscillations., 3h, Learning outcomes:7 11. Wave optics, photoelectric effect., 3h, Learning outcomes:8,9 12.Atomic structure, wave properties of particles., 3h, Learning outcomes:8,9 13.Electron shells., 1h, Learning outcomes:8 Semiconductors., 2h, Learning outcomes:8 14.Elementary particles, nuclear structure., 2h, Learning outcomes:10 Unstable nuclei., 1h, Learning outcomes:10 15.Radioactive decay, nuclear energy., 3h, Learning outcomes:10				
Course content auditory	1.Rectilinear motion., 2h, Learning outcomes:1 2.Rectilinear motion., 2h, Learning outcomes:1 3.Projectile motion., 2h, Learning outcomes:1,2 4.Circular motion., 2h, Learning outcomes:1,2 5.Newton axioms., 2h, Learning outcomes:3 6.Newton axioms., 2h, Learning outcomes:3 7.Work and power, energy., 2h, Learning outcomes:4 8.Collisions., 2h, Learning outcomes:4 9.1. partial exam, 2h, Learning outcomes:1,2,3,4 10.Rigid body rotation., 2h, Learning outcomes:2,3 11.Motion in gravitational field., 2h, Learning outcomes:5 12.Special theory of relativity., 2h, Learning outcomes:6 13.Bohr model of atom., 2h, Learning outcomes:8 14.Photoelectric effect., 1h, Learning outcomes:9 Radioactivity., 1h, Learning outcomes:10				

	15.2. partial exam, 2h, Learning outcomes:5,6,7,8,9
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector
Exam literature	Basic literature: 1. Levanat, I., Fizika za TVZ: Kinematika i dinamika, TVZ, Zagreb, 2010; Additional literature: 1. Young and Freedman, University Physics, Addison Wesley, San Francisco, 2007; 2. Kulišić, P., Mehanika i toplina, Školska knjiga, Zagreb, 2005
Students obligations	none
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:	Aktivnost ECTS (Written exam) 4 (Oral exam) 3
Remark	This course can not be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22682;
Proposal made by	prof.vis.šk. Ivica Levanat , 19. 01. 2014

Code WEB/ISVU	23420/155826	ECTS	6.0	Academic year	2018/2019
Name	Probability and Statistics				
Status	3rd semester - Software engineering (Redovni raarstvo) - obligatory course3rd semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (30+0+0+0) 120	
Teachers	Lectures:1. dr.sc. Igor Urbiha prof.vis.šk. Auditory exercises:dr.sc. Igor Urbiha prof.vis.šk.				
Course objectives	To teach students how to use the acquired knowledge in Statistics in solving engineering problems				
Learning outcomes:	1.ability to reach a conclusion about a random event, according to a definition. Level:6,7 2.ability to calculate probability according to the traditional formula "a priori" and through the axiom based probability . Level:6 3.ability to reach a conclusion about the basic properties of the probability function. Level:6,7 4.ability to organise the implementation of conditional probability. Level:6,7 5.ability to relate the notion of independence of an event to the solution to a problem. Level:6,7 6.ability to reach a conclusion about a discrete variable and its distribution, according to a definition. Level:6,7 7.identify whether a discrete random variable has an uniform, Bernoulli or some other distribution. Level:6 8.ability to reach a conclusion about a continuous random variable and its distribution of probability, especially in regard with normal distribution . Level:6,7 9.ability to reach a conclusion about the validity of a hypothesis based on statistical tests. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Discussion Questions and answers				
Methods of carrying out auditory exercises	Other				
Course content lectures	1.Descriptive statistics: frequency tables, histogram, cumulative function, 2h 2.Arithmetic mean, mode, median, quartile, percentile, quantile, 2h 3.Variance, standard deviation, Chebyshev theorem, comparision of different measurement, comparision of different results, 2h 4.Linear regression, 2h 5.1st exam, 2h 6.Random event, probability , 2h, Learning outcomes:1,2,3,4,5 7.Discrete random variable, distribution of a discrete random variable, 2h, Learning outcomes:6 8.Probability density function, probability distribution function, expectation, variance and standard deviation of a discrete random variable, 2h, Learning outcomes:6 9.Discrete uniform distribution, Bernoulli trial, Bernoulli scheme, binomial distribution, Poisson distribution, 2h, Learning outcomes:7 10.2nd exam, 2h, Learning outcomes:1,2,3,4,5,6,7 11.Continuous random variable, 2h, Learning outcomes:8 12.Normal (Gaussian) distribution, standard normal distribution, chi squared distribution, 2h, Learning outcomes:8 13.Testing a hypothesis for expectation with known variance, 2h, Learning outcomes:9 14.Chi squared test, 2h, Learning outcomes:9 15.3rd exam, 2h, Learning outcomes:8,9				
Course content auditory	1.Descriptive statistics: frequency tables, histogram, cumulative function, 2h 2.Arithmetic mean, mode, median, quartile, percentile, quantile, 2h 3.Variance, standard deviation, Chebyshev theorem, comparision of different measurement, comparision of different results, 2h 4.Linear regression, 2h 5.1st exam, 2h 6.Random event, probability , 2h, Learning outcomes:1,2,3,4,5 7.Discrete random variable, distribution of a discrete random variable, 2h, Learning outcomes:6 8.Probability density function, probability distribution function, expectation, variance and standard deviation of a discrete random variable, 2h, Learning outcomes:6 9.Discrete uniform distribution, Bernoulli trial, Bernoulli scheme, binomial distribution, Poisson distribution, 2h, Learning outcomes:7 10.2nd exam, 2h, Learning outcomes:1,2,3,4,5,6 11.Continuous random variable, 2h, Learning outcomes:8 12.Normal (Gaussian) distribution, standard normal distribution, chi squared distribution, 2h, Learning outcomes:8 13.Testing a hypothesis for expectation with known variance, 2h, Learning outcomes:9 14.Chi squared test, 2h, Learning outcomes:9 15.3rd exam, 2h, Learning outcomes:8,9				
Required materials	Basic: classroom, blackboard, chalk...				
Exam literature	Basic literature: 1. G. Ugrin-Šparac: Vjerojatnost, Tehničko veleučilište u Zagrebu, Elektrotehnički odjel, Zagreb, 1999. 2. M. Ilijašević, Ž. Pauše: Rješeni primjeri i zadaci iz vjerojatnosti i statistike, Zagreb poduzeće za grafičku djelatnost, Zagreb, 1990. Additional literature: 1. Ž. Pauše: Uvod u matematičku statistiku, Školska knjiga, Zagreb, 1993. 2. I. Pavlić: Statistička teorija i primjena, Tehnička knjiga, Zagreb, 1988.				

Students obligations	No special requirements
Knowledge evaluation during semester	Exams during semester
Knowledge evaluation after semester	There are three preliminary exams (three questions each), and if a student correctly solved at least one problem of each preliminary exam and correctly solved at least four problems of all three preliminary exams, it makes the student exempt from taking the written exam. The written part of the exam consists of five problems to be solved within 2 hours. A student may attempt to the oral part of the exam, if he has two correctly solved problems in the written part of the exam.
Student activities:	Aktivnost ECTS (Written exam) 6
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22737;

Code WEB/ISVU	23371/154960	ECTS	7.0	Academic year	2018/2019
Name	Programming				
Status	1st semester - Undergraduate professional study in computing (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			45+45 (15+30+0+0) 120	
Teachers	Lectures:1. Ivan Cesar mag. ing. Lectures:2. Mia Čarapina dipl. ing., pred. Auditory exercises: Ivan Cesar mag. ing. Auditory exercises: Mia Čarapina dipl. ing., pred. Laboratory exercises: Ivan Cesar mag. ing. Laboratory exercises: Mia Čarapina dipl. ing., pred. Laboratory exercises:dr.sc.rač. Ivica Dodig , prof.v.š.				
Course objectives	To teach students how to solve simple problems and implement computing algorithms by using contemporary structural and procedural programming languages				
Learning outcomes:	1.ability to analyse the C code. Level:6 2.ability to manage the basic programming tools (text editor, compiler, connector, debugger). Level:6,7 3.ability to design a simple algorithm by using programming tools (flowchart, pseudo code, structogram). Level:6 4.ability to anticipate the result of carrying out a segment of the C code, with predefined data input. Level:6,7 5.ability to design one's own programs with basic data types and structures. Level:6 6.ability to present the types and structures of files in everyday usage. Level:6,7 7.ability to design one's own programs with basic data types and structures. Level:6 8.ability to test an algorithm or a program code to find errors. Level:6 9.ability to redesign the C code according to an additional functional request. Level:6,7 10.ability to redesign one's own program according to a default file and operating system . Level:6,7 11.ability to develop an algorithm for solving a simple task. Level:6,7 12.ability to write a default or predefined simple algorithm in C. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Discussion				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Computer simulations Interactive problem solving Algorithm and problem tasks solving. Demonstration of progarmming tools based on typical algorithm examples.				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Individual student work on algorithm development and implementation, as well as existing code modification				
Course content lectures	1.Introduction, 3h, Learning outcomes:2 2.Programming languages history, first C-program, variables, 3h, Learning outcomes:1,2,3,4,5,6 3.Number systems, variable types, 3h, Learning outcomes:1,2,3,4,5,6,7,8 4.Algorithm definition, expressions and operators, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11 5.Program flow control, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 6.Loops, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 7.Arrays, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 8.Functions, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 9.Pointers, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 10.Pointers and functions, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 11.Pointers and arrays, dynamic memory allocation, recursion, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 12.Character arrays (strings), formatted input and output, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 13.Formatted files and structures, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 14.Unformatted files and unions, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 15.Advanced programming techniques (function pointers, variable number of parameters, important algorithms overview), 3h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12				
Course content auditory	1.Introduction, 1h, Learning outcomes:1 2.First C-program, 1h, Learning outcomes:1,2,3,4,5 3.Number systems, 1h, Learning outcomes:1,2,3 4.Operators and expressions, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 5.Program flow control, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 6.Loops, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 7.Arrays, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 8.Functions, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 9.Pointers, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 10.Pointers and functions, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 11.Pointers and arrays, dynamic memory allocation, recursion, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 12.Character arrays (strings), formatted input and output, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 13.Formatted files and structures, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 14.Unformatted files and unions, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 15.Practicing and repeatition, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12				
Course content laboratory	1.Number systems, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 2.Operators and expressions, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 3.Flow control, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12 4.Loops, 2h, Learning outcomes:1,2,3,4,5,6,8,9,11,12				

5.Arrays, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
6.First programming skills exam (exercises 1-5), 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
7.Functions, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
8.Pointers and functions, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
9.Pointers and arrays, dynamic memory allocation, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
10.Formatted files and structures, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
11.Unformatted files, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
12.Second programming skills exam (exercises 6-10), 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
13.Single exercise compensation, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11,12
14.Not in program, 2h
15.Not in program, 2h

Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector
Exam literature	Osnovna: 1. T. Tucaković: C programer za 15 dana, PRO-MIL 2. L. Ullman, M. Liyanage: C osnove programiranja, MIŠ Additional literature: 1. B.W. Kernighan, D.M. Ritchie: The C Programming Language, Prentice Hall
Students obligations	80% attendance rate in lab exercises, 1/3 points from lab exercises, 1/6 points from semestre.
Knowledge evaluation during semester	Redovitost pohaa#4#4#0$Mini-test#3#5#0$Kolokvij, numeri zadaci#2#16#0$Programski zadatak#2#42#0$Prakti rad#10#25#33$Prakti ispit#5#8#0$
Knowledge evaluation after semester	laboratory, written and oral exams
Student activities:	Aktivnost ECTS (Written exam) 7
Remark	This course can be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	22731;
Proposal made by	dr.sc. Dalibor Grgec, 8.5.2012.

Code WEB/ISVU	23095/91909	ECTS	6.0	Academic year	2018/2019
Name	Seminar Paper				
Status	5th semester - Software engineering (Redovni raarstvo) - obligatory course5th semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home				15+75 (0+0+75+0) 90
Teachers	Lectures:1. Goran Belamarić viši predavač Lectures:2. dr.sc. Željko Širanović prof.v.š. Lectures:4. dr.sc.rač. Davor Cafuta , prof.v.šk. Lectures:5. dr.sc.rač. Ivica Dodig , prof.v.š. Lectures:6. Vesna Alić-Kostešić dipl.ing.stroj. Lectures:7. Dunja Bjelobrk Knežević dipl.ing Lectures:8. Mia Čarapina dipl. ing., pred. Lectures:9. dr. sc. Roman Domović , prof. Lectures:10. Sanja Kraljević , dipl.ing., v. pred. Lectures:12. Dr. sc. Marko Horvat v. pred. Lectures:13. izv. prof. dr. sc. Petar Jandrić prof. v. šk. Lectures:14. Tin Kramberger struč. spec. ing. techn. inf., pred. Lectures:15. mr.sc. Sergej Lugović MBA Lectures:16. Nikola Majstorović dipl.ing. Lectures:17. mr.sc. Goran Malčić v.pred. Lectures:18. Vedrana Novinc Lectures:19. Bojan Nožica dipl. ing, v.pred. Lectures:21. Prof. dr. sc. Miroslav Slamić profesor visoke škole Lectures:22. dr.sc. Alen Šimec v. predavač Lectures:23. dr.sc. Igor Urbiha prof.vis.šk. Lectures:24. Ognjen Staničić dipl. ing. Lectures: Ivan Cesar mag. ing. Lectures: Mario Janković mag. ing. graph. techn. Lectures: Željko Kovačević , struč.spec.ing.techn.inf. Lectures:dr.sc. Mladen Mauher prof.v.šk. Lectures: Ognjen Mitrović struč. spec. ing. techn. inf., pred. Lectures: Danijela Pongrac , prof. Lectures:Pred. Ida Popčević prof. Lectures:v.pred. Aleksander Radovan , dipl. ing. Lectures:dr.sc. Biljana Stojaković ,prof.v.š. u trajnom zvanju Lectures: Željko Stojanović Lectures:Dr. sc. Aleksandar Stojanović pred.				
Course objectives	To teach students how to use the acquired knowledge in solving engineering tasks				
Learning outcomes:	1.ability to analyse a subject related to the field of expertise. Level:6 2.ability to prepare the sources (literature, etc.). Level:6,7 3.ability to write a seminar paper related to the field of expertise. Level:6,7 4.ability to formulate conclusions. Level:6,7 5.ability to format task based document s. Level:6 6.ability to prepare a presentation of a work related to the field of expertise. Level:6,7 7.ability to present a work related to the field of expertise to the audience. Level:6,7				
Methods of carrying out lectures	Case studies Discussion Other				
Methods of carrying out seminars	Traditional literature analysis Data mining and knowledge discovery on the Web Discussion, brainstorming Computer simulations Workshop Other				
Course content lectures	1.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 2.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 3.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 4.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 5.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 6.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 7.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 8.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 9.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 10.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 11.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 12.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 13.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 14.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 15.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7				
Course content seminars	1.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 2.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7				

	3.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 4.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 5.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 6.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 7.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 8.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 9.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 10.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 11.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 12.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 13.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 14.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7 15.In cooperation with the mentor., 2h, Learning outcomes:1,2,3,4,5,6,7
Required materials	Special equipment
Exam literature	Prema dogovoru sa mentorom
Students obligations	maximum of 3 absences from exercises
Knowledge evaluation during semester	maximum of 3 absences from exercises
Knowledge evaluation after semester	maximum of 3 absences from exercises
Student activities:	Aktivnost ECTS (Practical work) 3 (Seminar Work) 3
Remark	This course can not be used for final thesis theme
Prerequisites:	No prerequisites.
ISVU equivalents:	39172;39690;200082;
Proposal made by	Alen Šimec, PhD

Code WEB/ISVU	22966/22722	ECTS	6.0	Academic year	2018/2019
Name	Soft Computing Methods				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 120	
Teachers	Lectures: Dunja Bjelobrk Knežević dipl.ing Laboratory exercises: Dunja Bjelobrk Knežević dipl.ing				
Course objectives	To transfer to students the knowledge and skills related to solving practical problems by using nonconventional computing methods				
Learning outcomes:	1.ability to write a code of an application which uses genetic algorithms or neural networks. Level:6,7 2.ability to combine various non-conventional programming techniques . Level:6,7 3.ability to discover a configuration of genetic algorithms or neural networks parameters which give the best results. Level:6,7 4.abilityto solve a problem which does not allow using the usual methods of code writing. Level:6 5.ability to analyse the results gotten by using non-conventional ways of programming. Level:6 6.ability to design a system suitable for using non-conventional ways of programming. Level:6 7.abilityto identify a scenario for using genetic algorithms and neural networks. Level:6 8.ability to formulate the rules of fuzzy logic in a fuzzy system. Level:6,7 9.ability to prepare samples as a basis of neural networks study. Level:6,7 10.ability to make a report which documents on the results of a system which uses non-conventional programming procedures. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Group problem solving Computer simulations				
Course content lectures	1.Introduction to soft computing methods, 2h, Learning outcomes:2,4,6 2.Genetic algorithms, 2h, Learning outcomes:1,7 3.Implementation of genetic algorithms , 2h, Learning outcomes:1,3,7 4.Introduction to neural networks, 2h, Learning outcomes:1,3,7 5.Learning methods of neural networks, 2h, Learning outcomes:1,2,3,7,9 6.First partial exam, 1h, Learning outcomes:1,2,3,4,5,6,7 7.Using neural network with Encog framework and Java programming language , 2h, Learning outcomes:1,3,9 8.Analysis of image recognition example with neural networks, 2h, Learning outcomes:1,3,9 9.Neuroph framework, 2h, Learning outcomes:2,3,4,5,6,9 10.Second partial exam, 1h, Learning outcomes:1,2,3,4,5,6,7,9 11.Fuzzy logic, 2h, Learning outcomes:2,4,5,6,8 12.Problem solving using fuzzy logic, 2h, Learning outcomes:2,4,5,6,8 13.Fuzzy systems implementation, 5h, Learning outcomes:2,4,5,6,8 14.Java implementation of jFuzzyLogic library, 2h, Learning outcomes:2,4,5,6,8 15.Final exam, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9				
Course content laboratory	1.No classes, 2h 2.No classes, 2h 3.No classes, 2h 4.Solving simple problems using genetic algorithms , 2h, Learning outcomes:1,2,3,4,5,6,7,10 5.Solving simple problems using genetic algorithms , 2h, Learning outcomes:1,2,3,4,5,6,7,10 6.Solving complex problems using genetic algorithms , 2h, Learning outcomes:1,2,3,4,5,6,7,10 7.Solving complex problems using genetic algorithms, 2h, Learning outcomes:1,2,3,4,5,6,7,10 8.Solving simple problems using neural networks, 2h, Learning outcomes:1,2,3,4,5,6,7,9,10 9.Solving simple problems using neural networks, 2h, Learning outcomes:1,2,3,4,5,6,7,9,10 10.Image recognition using neural netwoks , 2h, Learning outcomes:1,2,3,4,5,6,7,9,10 11.Image recognition using neural netwoks, 2h, Learning outcomes:1,2,3,4,5,6,7,9,10 12.Events prediction using neural netwoks , 2h, Learning outcomes:1,2,3,4,5,6,7,9,10 13.Events prediction using neural netwoks, 2h, Learning outcomes:1,2,3,4,5,6,7,9,10 14.Solving simple problems using fuzzy logic, 2h, Learning outcomes:2,4,5,6,8,10 15.Solving simple problems using fuzzy logic, 2h, Learning outcomes:2,4,5,6,8,10				
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector				
Exam literature	Basic literature: 1. J.-S. R. Jang, C.-T. Sun, E.Mizutani: Neuro-Fuzzy and Soft Computing, Prentice Hall, 1997 Additional literature: 1. M. Friedman, A. Kandel: Introduction to pattern recognition: Statistical, structural, neural, and fuzzy logic approaches, World Scientific Publishing Co., Singapore, 1999 2. L. Dawis (ed.): Handbook of genetic algorithms, Van Nostrand Reinhold, NY, 1991. Jeff Heaton, Programming Neural Networks with Encog 3 in Java, 2011.				
Students obligations	Solving all six laboratory exercices.				
Knowledge	Six laboratory exams - 60 points				

evaluation during semester	Two partial exams - 10 points each Final exam - 20 points Optional points for additional effort Maximum 100 points 0-49 - not good enough 50-61 - sufficient 62-74 - good 75-86 - very good 87-100 - excellent
Knowledge evaluation after semester	Written exam is evalued with 40 points, and remaining 60 points are transferred from the achievement on laboratory exams during the semester time.
Student activities:	Aktivnost ECTS (Constantly tested knowledge) 6
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Programiranje u jeziku Java
Proposal made by	Aleksander Radovan, BSc. engineer, lecturer, 16.12.2013.

Code WEB/ISVU	23338/147088	ECTS	5.0	Academic year	2018/2019
Name	UNIX Systems Administration				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - obligatory course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 90	
Teachers	Lectures:1. dr.sc.rač. Ivica Dodig , prof.v.š. Lectures:dr.sc.rač. Davor Cafuta , prof.v.šk. Laboratory exercises:dr.sc.rač. Davor Cafuta , prof.v.šk. Laboratory exercises:dr.sc.rač. Ivica Dodig , prof.v.š. Laboratory exercises: Andrej Vitez				
Course objectives	To enable students to practically solve office informatization tasks on various operating systems.				
Learning outcomes:	1.ability to build a DNS server on UNIX OS. Level:6 2.ability to devise a Web server on UNIX OS. Level:6 3.ability to integrate a database with a Web server on UNIX OS. Level:6,7 4.ability to build a system for time based starting of a service. Level:6,7 5.ability to create a shared file system. Level:6,7 6.ability to control packages which pass through a security network layer on UNIX server. Level:6,7 7.ability to create an e-mail server. Level:6,7 8.ability to connect an e-mail filtering service with an e-mail service. Level:6,7 9.ability to analyse the network traffic going through security layer on UNIX OS. Level:6 10.ability to identify errors committed in setting up UNIX system services. Level:6 11.ability to test the functioning of services on UNIX server. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Simulations Discussion				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Laboratory exercises, computer simulations				
Course content lectures	1.Doamin name system, 2h, Learning outcomes:1,11 2.Domain name system administration, 2h, Learning outcomes:1,11 3.Web server configuration., 2h, Learning outcomes:2,11 4.Integration of server side languages into web server., 2h, Learning outcomes:2,11 5.Databases, 2h, Learning outcomes:3,11 6.Application scheduler., 2h, Learning outcomes:4,11 7.E-mail systems., 2h, Learning outcomes:7,11 8.E-mail server administration, 2h, Learning outcomes:7,11 9.E-mail server anti spam technologies., 2h, Learning outcomes:8,11 10.Incoming mail server protocols., 2h, Learning outcomes:7,8,11 11.Windows to UNIX sharing, 2h, Learning outcomes:5,11 12.Unix to Windows sharing, 2h, Learning outcomes:5,11 13.Firewall, 2h, Learning outcomes:9,11 14.Troubleshooting and backup, 2h, Learning outcomes:10,11 15.Theoretical exam, 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10,11				
Course content laboratory	1.-, 2h 2.Domain name system administration, 2h, Learning outcomes:1 3.Web server configuration., 2h, Learning outcomes:2 4.Integration of server side languages into web server., 2h, Learning outcomes:2 5.Databases, 2h, Learning outcomes:3 6.Application scheduler., 2h, Learning outcomes:5 7.-, 2h 8.E-mail server administration, 2h, Learning outcomes:7 9.E-mail server anti spam technologies., 2h, Learning outcomes:8 10.Incoming mail server protocols., 2h, Learning outcomes:7,8 11.Windows to UNIX sharing, 2h, Learning outcomes:5,11 12.Unix to Windows sharing, 2h, Learning outcomes:5,11 13.Firewall, 2h, Learning outcomes:9,11 14.Troubleshooting and backup, 2h, Learning outcomes:10,11 15.Practical exam, 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10				
Required materials	Special purpose computer laboratory Whiteboard with markers Overhead projector Special equipment				
Exam literature	Basic literature: 1. Materijali uz predmet (internet stranice) 2. C. Hunt,TCP/IP Network Administration, 3rd edition, O'Reilly, 2002. 3. S. Pritchard, et.all, LPI Linux Certification, 2nd edition, O'Reilly, 2006. Additional literature: 1. Linux Magazin (izdvojeni brojevi)				

Students obligations	Minimum of 13 point from laboratory work.
Knowledge evaluation during semester	Course is divided into 7 parts. Upon every part last one is checked with theoretical exam (3points x 6 parts) and practical work (1 point). At the end of the semester theoretical exam (21 point) and practical exam (54 point) checks all 7 parts. More information in first lecture in repository of the course.
Knowledge evaluation after semester	Laboratory points are obtained during semester. Additionaly, theoretical exam (21 point) and practical exam (54 point) checks all 7 parts. More information in first lecture in repository of the course.
Student activities:	Aktivnost ECTS (Written exam) 5
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Uvod u UNIX sustave
ISVU equivalents:	22655;63199;
Proposal made by	Ivica Dodig, Davor Cafuta (08.01.2014)

Code WEB/ISVU	23038/75220	ECTS	5.0	Academic year	2018/2019
Name	Web application development				
Status	4th semester - Software engineering (Redovni raarstvo) - elective course4th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 90	
Teachers	Lectures:1. dr.sc. Alen Šimec v. predavač Laboratory exercises: Petar Osterman Laboratory exercises:dr.sc. Alen Šimec v. predavač				
Course objectives	Acquisition of basic knowledge in the design and development of web applications				
Learning outcomes:	1.ability to prepare a computer for a presentation of Web applications. Level:6 2.ability to distinguish between different programming tools for the development of client-site and server-site applications. Level:6 3.ability to make a project plan for the development of Web applications . Level:6,7 4.ability to combine the programming tools used for the development of Web applications. Level:6,7 5.ability to develop a database model. Level:6,7 6.ability to create a program module of a Web application. Level:6 7.ability to design a Web page. Level:6				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Simulations Modelling Discussion Questions and answers Seminar, students presentation and discussion Lectures, examples from real life, creation methodology, independent work				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Group problem solving Discussion, brainstorming Interactive problem solving Workshop Creating and solving problems.				
Course content lectures	1.Introductory lecture and teach students about the responsibilities and teaching material., 2h, Learning outcomes:1 2.Introduction to HTML5 and what it is. Examples from practice. The difference between HTML and XHTML., 2h, Learning outcomes:2 3.Formatting an HTML5 document and create links. Definition of CSS3 and how to use it with the HTML document. Examples from practice., 2h, Learning outcomes:2 4.HTML5 forms, where they are used and what they do. Examples from practice. Model executing scripts on the server. HTTP POST and GET. Examples from practice., 2h, Learning outcomes:3 5.A client-server architecture, the characteristics of the client and the server, Apache Web server and how it works., 2h, Learning outcomes:3 6.Introduction to PHP scripting language, server side web applications., 2h, Learning outcomes:4 7.Examination of the first part of the theory, html, forms, CSS, basic web server and its function, php scripting language., 2h, Learning outcomes:4 8.PHP syntax and its usage, the PHP variables and labeling rules., 2h, Learning outcomes:5 9.Data types and strings, using operators and loops., 2h, Learning outcomes:5 10.Application of the loop in the programming environment, data fields, require and include commands., 2h, Learning outcomes:6 11.MySQL database, its application and what they do. Examples of how to create a relational database., 2h, Learning outcomes:6 12.Connecting PHP scripting language with the database, query the database and display the search results. Enter, change, and delete data from the database through the form., 2h, Learning outcomes:6,7 13.What is Javascript, which is its application and what it is used, examples in practice, 2h, Learning outcomes:6,7 14.Web application security, how to protect yourself and which are the most common forms of attacks on web applications, 2h, Learning outcomes:6,7 15.Examination of the second part of the theory, php (syntax, data types, data fields, loops), MySQL database, SQL queries to the database, XML, RSS., 2h, Learning outcomes:2				
Course content laboratory	1.Introductory exercises teach students about the duties and educational materials, and prepares the computer to work with the scripting language., 2h, Learning outcomes:1 2.Installing Virtual Server on the computer, learning about their work environment. It takes practice to install Apache, MySQL database and FTP client., 2h, Learning outcomes:2 3.Solving the task and making HTML5 pages. Using only simple programs that do not have a GUI (Notepad + +, UltraEdit, Notepad, Wordpad), the knowledge of writing HTML code, verification and validation code., 2h, Learning outcomes:2 4.Solving the task and making the HTML5 code with the added document formatting using CSS tools. Using only simple programs that do not have a GUI (Notepad + +, UltraEdit, Notepad, Wordpad), the knowledge of writing CSS code, verification and validation code., 2h, Learning outcomes:2 5.Creating forms using a text editor. Check dunkcionalnosti for HTTP POST and GET. Solving problems with the forms and print text on the screen. Work on the local computer with virtual services in open source environment., 2h, Learning outcomes:3 6.Repetition of knowledge and development of Internet sites on a virtual server using HTML markup text, forms, CSS, PHP., 2h, Learning outcomes:3 7.Examination of the first part of practice, HTML, forms, CSS, basic web server and its function, php scripting language., 2h, Learning outcomes:4 8.Introducing the virtual environment Xampp applications, run applications required for operation of the virtual server,				

solving tasks., 2h, Learning outcomes:4

9.Solving problems using PHP syntax, PHP variables and labeling rules in HTML, 2h, Learning outcomes:5

10.Solving problems in PHP, data types, strings, use the operator and the loop, 2h, Learning outcomes:5

11.Application of the loop in the programming environment, data fields, require and include commands, 2h, Learning outcomes:5

12.Using MySql database, creating databases, tables, fields in the table, define the fields, their values, the determination of the primary and secondary key., 2h, Learning outcomes:6

13.Connecting to MySQL database with the programming code in PHP, and the appointment of a query to the database (read data from the database, data modification and deletion of data), the print data from the database to display user, 2h, Learning outcomes:6,7

14.Using JavaScript in your application and protection of Web applications from attacks, web application security, 2h, Learning outcomes:6,7

15.Examination of the second part of the practice, php (syntax, data types, data fields, loops), MySQL database, SQL queries to the database, XML, RSS., 2h

Required materials	Basic: classroom, blackboard, chalk... Special purpose computer laboratory Overhead projector Tools Special equipment Web server package (Xampp application)
Exam literature	Šimec, Alen; Programiranje i optimizacija Internet stranica u HTML5 okruženju; Tehničko veleučilište u Zagrebu; 2015; Šimec, Alen; Uvod u HTML, XHTML i CSS; Tehničko veleučilište u Zagrebu; 2011; Čarapina, M.: XAMPP - upute za instalaciju i korištenje, 2012., Tehničko veleučilište u Zagrebu; Nixon, Robin; Learning PHP, MySQL, JavaScript, CSS HTML5, 3rd Edition; O'Reilly Media; 2014.; Seyed M.M. "Saied Tahaghoghi; Hugh E. Williams; Learning MySQL; O'Reilly Media; 2007. PHP (www.php.net); Apache (www.apache.org) MySQL (www.mysql.com); W3C preporuke (www.w3c.org); W3Schools Online Web Tutorials (www.w3schools.com);
Students obligations	Attendance and active participation in lectures 15 points Attendance and active participation in training 15 points Essay and project 20 points
Knowledge evaluation during semester	1st Colloquium (theory and tasks) 25 points 2nd Colloquium (theory and tasks) 25 points
Knowledge evaluation after semester	Written exam 100 points
Student activities:	Aktivnost ECTS (Classes attendance) 1 (Project) 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 Uvod u web tehnologije
ISVU equivalents:	22740;
Proposal made by	Alen Šimec, PhD

Code WEB/ISVU	23104/111517	ECTS	6.0	Academic year	2018/2019
Name	Web application development in ASP.NET MVC technology				
Status	6th semester - Software engineering (Redovni raarstvo) - elective course6th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+30 (0+30+0+0) 120	
Teachers	Lectures:1. Ivan Cesar mag. ing. Laboratory exercises: Ivan Cesar mag. ing.				
Course objectives	To introduce students to the ASP.NET MVC technology and qualify them for individual development of multilayer Web applications with a possibility of using a database.				
Learning outcomes:	1.to analyse data flow between a client and a server. Level:6 2.to develop a multilayer ASP.NET MVC application. Level:6 3.to anticipate potential problems in the development of an application. Level:6,7 4.to connect the URLs with corresponding actions on a server. Level:6,7 5.to design LINQ queries on collections and objects. Level:6 6.to integrate the Entity framework first into an ASP.NET MVC application . Level:6,7 7.to control the authorization and authentication mechanisms. Level:6,7 8.to combine client libraries with asynchronous requests to the server. Level:6,7 9.o create mechanisms of master-detail data binding in a single request to the server. Level:6,7 10.API interface using Web API 2 technology. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Discussion Seminar, students presentation and discussion				
Methods of carrying out laboratory exercises	Laboratory exercises on laboratory equipment Data mining and knowledge discovery on the Web				
Course content lectures	1.C# language basics, 2h, Learning outcomes:1,2,3 2.Http protocol properties: request and response. Html forms, get, post., 2h, Learning outcomes:1,2,3 3.Model-view-controller paradigm concept. Multi-layer ASP.NET MVC application architecture., 2h, Learning outcomes:2,3,4 4.Connecting URL location with controller actions with additional URL parameters transfer (routing). URL appliaction areas., 2h, Learning outcomes:2,3,4 5.Authorization and authentification in ASP.NET MVC web applications., 2h, Learning outcomes:3,4,5 6.ASP.NET MVC razor nomenclature intro., 2h, Learning outcomes:4,5,6 7.LINQ, 2h, Learning outcomes:4,5,6 8.Model binding in ASP.NET MVC technology., 2h, Learning outcomes:5,6,7 9.Package manager console usage. Entity framework code-first technology and repository pattern, Entity framework code-first migrations., 2h, Learning outcomes:5,6,7 10.Basic principles of javascript and jQuery libraries. Principles of ASP.NET MVC ajax mechanisms. Partial views and user controls., 2h, Learning outcomes:6,7,8 11.Validation. Caching. Custom action filters., 2h, Learning outcomes:6,7,8 12.Testing controllers in ASP.NET MVC application., 2h, Learning outcomes:7,8,9 13.Deployment to production environment., 2h, Learning outcomes:7,8,9 14.Integrating Web API 2 interface into application, 2h, Learning outcomes:8,9,10 15.User-defined model binding. Binding between form data and collections (master-detail)., 2h, Learning outcomes:8,9,10				
Course content laboratory	1.Introduction to development environment (VS2013, chrome dev). C# basics., 2h, Learning outcomes:1 2.Http protocol properties: request and response. Html forms, get, post., 2h, Learning outcomes:1,2 3.Model-view-controller paradigm concept. Multi-layer ASP.NET MVC application architecture., 2h, Learning outcomes:2,3,4 4.Connecting URL location with controller actions with additional URL parameters transfer (routing). URL appliaction areas., 2h, Learning outcomes:2,3,4,5 5.Authorization and authentification in ASP.NET MVC web applications., 2h, Learning outcomes:3,4,5,6 6.ASP.NET MVC razor nomenclature intro., 2h, Learning outcomes:4,5,6,7 7.LINQ., 2h, Learning outcomes:5,6,7 8.Model binding in ASP.NET MVC technology., 2h, Learning outcomes:3,4,5,6,7 9.Package manager console usage. Entity framework code-first technology and repository pattern, Entity framework code-first migrations., 2h, Learning outcomes:3,4,5,6,7,8 10.Basic principles of javascript and jQuery libraries. Principles of ASP.NET MVC ajax mechanisms. Partial views and user controls., 2h, Learning outcomes:5,6,7,8 11.Validation. Caching. Custom action filters., 2h, Learning outcomes:6,7,8,9 12.Testing controllers in ASP.NET MVC application., 2h, Learning outcomes:7,8,9,10 13.Deployment to production environment., 2h, Learning outcomes:8,9,10 14.Integrating Web API 2 interface into application, 2h, Learning outcomes:9,10 15.User-defined model binding. Binding between form data and collections (master-detail)., 2h, Learning outcomes:10				
Required materials	Basic: classroom, blackboard, chalk... Special purpose computer laboratory Overhead projector				
Exam literature	1. I. Cesar elektronički sadržaji predavanja (PPT prezentacije) na web stranici predmeta na Tehničkom veleučilištu u Zagrebu, 2013., www.tvz.hr				

	2. A. Freeman, Pro ASP.NET MVC 4, Apress, 4th edition, 2012
Students obligations	Exercises and lectures attendance, 30% of maximum points in lab. exercises, project completeness.
Knowledge evaluation during semester	Lab exercises#12#60#30$Practical work#1#40#50$
Knowledge evaluation after semester	Oral exam#1#30#70$Practical work#1#70#70$
Student activities:	Aktivnost ECTS (Written exam) 6
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Objektno orijentirano programiranje Students cannot enroll in this course unless they have passed Baze podataka
Proposal made by	Ivan Cesar , 22.5.2013

Code WEB/ISVU	23039/75223	ECTS	6.0	Academic year	2018/2019
Name	Web application in Java				
Status	6th semester - Software engineering (Redovni raarstvo) - elective course6th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			60+60 (0+60+0+0) 60	
Teachers	Lectures:1. v.pred. Aleksander Radovan , dipl. ing. Laboratory exercises: Matija Dujmović				
Course objectives	Mastering advanced techniques of software development and application frameworks in the Java programming language.				
Learning outcomes:	1.ability to write a Java Web application code to be executed on a server and used by means of a browser. Level:6,7 2.ability to design a Java Web application which will use a 3layer (MVC) architecture. Level:6 3.ability to organise the application components on an interface, the business logic and data layer. Level:6,7 4.ability to relate elements of the application to new open source libraries. Level:6,7 5.ability to develop one's own components based on the OOP reusable principles . Level:6,7 6.ability to adjust integrated development environment Spring Tool Suite for effective development of Java web applications. Level:6 7.ability to analyse the functional elements of the application and adjust them to the MVC architecture. Level:6,7 8.ability to integrate a Java Web application with different software frameworks which speed up the development. Level:6 9.compare a development process of JavaFX applications with development process of web applications. Level:6,7 10.choose Spring boot framework for development process optimization. Level:7 11.choose Tyhmeleaf for developing a front end user interface. Level:7 12.Design internationalization in Java web application. Level:6 13.Integrate scheduled jobs to Java web applications. Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Demonstration Discussion Seminar, students presentation and discussion				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Computer simulations				
Course content lectures	1.Introductory lecture, 2h 2.Java web application introduction, 2h, Learning outcomes:10 3.Introduction to Spring framework, 2h, Learning outcomes:2,3,4,5,6,7,8,10 4.Spring MVC, 2h, Learning outcomes:2,3,4,5,6,7,8,10 5.Java web application scopes, 2h, Learning outcomes:4,10 6.Thymeleaf, 2h, Learning outcomes:11 7.Spring Security, 2h, Learning outcomes:4,7 8.Web application and databases, 2h, Learning outcomes:4,7,10 9.Midterm Exam, 2h 10.Spring Data JPA, 2h, Learning outcomes:4,10 11.Hibernate, 2h, Learning outcomes:4,6,9,10 12.Spring MVC REST and Quartz scheduler, 2h, Learning outcomes:2,3,4,9,13 13.Spring Boot and internationalization, 2h, Learning outcomes:10,12 14.jUnit testing, 2h, Learning outcomes:4 15.Final exam, 2h				
Course content laboratory	1.No classes, 2h 2.No classes, 2h 3.Simple Java web application with GET and POST requests, 2h, Learning outcomes:1,6 4.Application scopes in Java web application, 2h, Learning outcomes:1,4 5.Thymeleaf, 2h, Learning outcomes:1,4,8,9 6.Spring Security, 2h, Learning outcomes:1,4,6,10 7.Connecting Java web applications to database, 2h, Learning outcomes:1,2,3,4,5,7,9 8.Spring Data JPA, 2h, Learning outcomes:1,2,3,4,5,7,9 9.Hibernate, 2h, Learning outcomes:1,2,3,4,5,7,9 10.Spring MVC REST, 2h, Learning outcomes:5,7 11.Spring Boot, 2h, Learning outcomes:10 12.jUnit testiranje, 2h, Learning outcomes:1,4,6,7 13.Final Exam, 2h 14.Laboratory exercises makeup, 2h 15.Laboratory exercises makeup, 2h				
Required materials	Basic: classroom, blackboard, chalk... General purpose computer laboratory Whiteboard with markers Overhead projector				
Exam literature	Spring in Action, 5rd Edition, Manning, 2018. Web development with Java, using Hibernate, JSPs and Servlets Springer 2007. Pro Apache Tomcat 6 Apress, 2007. Head First Servlet and JSP 2nd edition O'Reilly, 2008.				

	Next Generation Java Testing, Addison-Wesley, 2008. Spring Persistence with Hibernate, Packt Publishing, 2009. Java Persistence with Hibernate, Second Edition, Manning, 2015. Tutorial: Thymeleaf + Spring, 2016. Spring Security Essentials, 2016, Packt Spring boot in Action, 2016, Manning
Students obligations	Attendance on at least 60% of lectures and earning at least 40 points from the laboratory exercises.
Knowledge evaluation during semester	Ten laboratory exercises per 6 points each = 60 points Partial Exams = 40 points Maximum 100 points Optional points for additional effort Mark level thresholds: #8805; 50 60 : sufficient (2) > 60 72 : good (3) > 72 86 : very good (4) > 86 100 : excellent (5) 87-100 - excellent
Knowledge evaluation after semester	The course consists of 100 points from which the exam carries 40 points, and the remaining 60 points are earned from the achievement on laboratory exams during the semester.
Student activities:	Aktivnost ECTS (Practical work) 4 (Written exam) 2
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have passed Baze podataka Students cannot enroll in this course unless they have passed Programiranje u jeziku Java
Proposal made by	Aleksander Radovan MSc, v. pred., 03.06.2018.

Code WEB/ISVU	23069/83677	ECTS	6.0	Academic year	2018/2019
Name	Web Design				
Status	5th semester - Software engineering (Redovni raarstvo) - elective course5th semester - Computer systems and network engineering (Redovni raarstvo) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home			30+60 (0+60+0+0) 90	
Teachers	Lectures:2. dr.sc. Maja Turčić pred. Lectures: Mario Janković mag. ing. graph. techn. Laboratory exercises: Mario Janković mag. ing. graph. techn. Laboratory exercises:dr.sc. Maja Turčić pred.				
Course objectives	To transfer to students the basic knowledge related to Web design: concept, design and realisation				
Learning outcomes:	1.ability to distinguish between different groups of Web sites, depending on a subject. Level:6 2.ability to give comments on advantages of certain solutions, depending on their purpose. Level:6 3.ability to identify the current state of affairs on the Web and anticipate the development by groups. Level:6 4.abilityto give comments on imperfections of certain solutions, to take a critical attitude. Level:6 5.ability to create tender documentation. Level:6 6.ability to design a task based Web page as an author work . Level:6 7.ability to test the functionality of author works. Level:6 8.ability ability to develop an authentic and usable Web page . Level:6,7 9.ability to check the functionality . Level:6 10.ability to present a project development. Level:6,7 11.ability to create interactive graphic applications. Level:6,7 12.ability to prepare a Web page to be uploaded and posted on the Internet. Level:6,7 13.ability to devise a public presentation . Level:6,7				
Methods of carrying out lectures	Ex cathedra teaching Guest lecturer Case studies Lecturing and analysis of the existing solutions linked with the task, consideration of advantages and disadvantages of individual concepts, acquiring the knowledge necessary for independent work.				
Methods of carrying out laboratory exercises	Laboratory exercises, computer simulations Group problem solving Discussion, brainstorming Workshop Elaboration of preliminary designs with the help of computers				
Course content lectures	1.content planning, architecture of information and basic web page anatomy, 2h, Learning outcomes:1,5 2.basic web design principles, the difference of media, 2h, Learning outcomes:2,12 3.wireframing, 2h, Learning outcomes:3 4.static and dinamic layout, 2h, Learning outcomes:4 5.responsive layout, 2h, Learning outcomes:4,8 6.designing and differentiating navigation elements, 2h, Learning outcomes:6,8 7.web design typography, 2h, Learning outcomes:6,8 8.colour theory, 2h, Learning outcomes:9 9.preparation of images and graphics for web , 2h, Learning outcomes:11 10.background design and animation, 2h, Learning outcomes:8,11 11.forms, link and table design, 2h, Learning outcomes:8,9 12.user experience importance, 2h, Learning outcomes:8,9 13.usability of a web page, 2h, Learning outcomes:7,8,9 14.project presentation, 2h, Learning outcomes:9,13 15.no lesson, 2h				
Course content laboratory	1.familiarising with the tools, 2h, Learning outcomes:3,7 2.wireframe web design , 2h, Learning outcomes:6,8 3.making of the layout gird , 2h, Learning outcomes:6,8 4.navigation design, 2h, Learning outcomes:6,8 5.layout of elements, 2h, Learning outcomes:6,8 6.choosing and editing of images, 2h, Learning outcomes:6,8 7.project assesment, 2h, Learning outcomes:3,4,6,7,8,9,10 8.color scheme selection, 2h, Learning outcomes:6,8 9.typography implementation, 2h, Learning outcomes:6,8 10.transition design and interactivity design, 2h, Learning outcomes:6,11 11.responsive web design, 2h, Learning outcomes:6,11 12.responsive design continued, 2h, Learning outcomes:6,11 13.web page testing, 2h, Learning outcomes:7,9,12 14.project assesment, 2h, Learning outcomes:4,6,7,8,9,10,11,12 15.project presentation, 2h, Learning outcomes:5,13				
Required materials	Special purpose computer laboratory Overhead projector Video equipment				
Exam literature	Basic literature: 1. Darko Grundler, Diana Franulić-Šarić i Tomislav Rolich, Primijenjeno računalstvo - izabrani primjeri, (III. prošireno i izmijenjeno izdanje), Graphis, Zagreb , ISBN 953-6647-36-2, 2002, 204 str. 2. Nico MacDonald, What Is Web Design, RotoVision SA, Mies CH, ISBN 2-88046-686-5 , 2003, 256 str. 3. Robin Nixon, Learning PHP, MySQL, and JavaScript, O'Reilly Media, 2009 ISBN 978-0596157135 528 str.				

Students obligations	mandatory attendance of exercises (maximum of 2 absences from exercises) project development for the given assignement
Knowledge evaluation during semester	Exercise attendance project development
Knowledge evaluation after semester	Project presentation Oral exam
Student activities:	Aktivnost ECTS (Written exam) 6
Remark	This course can be used for final thesis theme
Prerequisites:	Students cannot enroll in this course unless they have completed Programiranje web aplikacija
Proposal made by	pred. Maja Turčić, dipl.ing