



MEDITERRANEAN UNIVERSITY PODGORICA  
FACULTY OF INFORMATION TECHNOLOGIES

SUBJECT LIST  
MASTER STUDIES

<b>INFORMATION SYSTEM STRATEGY</b>				
<b>GENERAL INFORMATION</b>				
Course code:	B103	Professor:	Prof.dr Snežana Šćepanović	
Course status:	Mandatory	Teaching Assistant:		
Study year:	1.	Consultations:	By appointment	
Semester:	I (winter)	Study	Academic studies	
ECTS:	10		Information Technology	
<b>SCHEDULE</b>				
Lectures		Practice		Laboratory
32 (2h nedeljno)		32 (2 nedeljno)		1 (16 nedeljno)
<b>STUDENTS' WORKLOAD</b>				
	By week	By semester	Total during the semester:	
Lectures	2:00 h	32:00 h	Teaching and final exam:	213:20 h
Practice	2:00 h	32:00 h	Necessary preparations for enrollment and certification of the semester	26:40 h
Laboratory	1:00 h	16:00 h		
Independent study work and consultations	8:20 h	131:20 h	Exam preparation and taking in the remedial exam period	60:00 h
Total:	13:20 h	213:20 h	Total:	300:00 h
<b>COURSE DESCRIPTION</b>				
Prerequisites: Software Engineering Basic				
Objectives: Within the course, students acquire theoretical and practical knowledge needed to acquire, collect, specify and validate requirements for the development of information systems using classical and agile methods. Through examples from theory and practice, students are introduced to the methods of IT Strategic Planning Process and measurable business benefits deriving from the application of IT/IS in business (key performance indicators- KPI) Students acquire knowledge in the field of information system planning and development with the aim of achieving EU standards set in the Digital Agenda and the Digital Single Market Strategy, network economy and innovation in strategic IS planning (moving towards digital organization).				
Teaching methods: Predavanja, vježbe, seminarski, kolokvijumi i završni ispit. Konsultacije.				
<b>COURSE CONTENT</b>				
Preparation week	Preparation and semester enrolment			
I week	Introduction to Corporate Information Strategy and Management. IT and Business advantages Business models ( Analysing Strategy, Capabilities, Value , Stakeholders, evolving bussiness models)			
II week	Strategic Information Systems Plan: IT Strategy and Organization Strategy I - IT impact on Business models performance. IT Impact on Organizations -Characteristics of the Hierarchy, Entrepreneurial, and Networked Organization			
III week	Strategic Information Systems Plan: IT Strategy and Organization Strategy II - Business Model Drivers and Performance Metrics. The management of risks.			
IV week	Quality and Productivity Process, such as CMU's Comparability Maturity Model CMMi, ITIL, and ISO.			
V nedjelja	Standard ISO/IEC/IEEE 29148:2011 - Recommended Practice for Requirements Specifications Standard ISO/IEC/IEEE 26515:2011 – Agile methodologies recommended Practice for Requirements Specifications			
VI week	Organization Issues in Information Systems Development Life Cycle			
VII week	Free week			
VIII week	Decision making for the Information Systems (IS) and Information Technologies (IT) Security			

	E-Government framework. Strateški nivo. Poslovni nivo, tehnički nivo
IX week	Managing IT Service Delivery - New Service models (On Demand, Software as a Service, Cloud Services and Grid Computing Models)
X week	Strategic Decision Making in the areas of IS and IT - Information Technology Acquisition, Vendor Relationships and Contract Negotiation
XI week	Project Management A Portfolio Approach to Managing IT Projects
XII week	Managing IT Project Execution and delivery. Managing Sources of Implementation Risk
XIII nedjelja	Praktičan rad–završni projekat: Analiza domena i ciljeva IS, definisanje korisnika i stejkholdera, definisanje metoda za prikupljanje i specifikaciju zahtjeva. Specifikacija zahtjeva u skladu sa IEEE standardima. Validacija i verifikacija zahtjeva.
XIV week	Evaluation of IS Strategic Plans and Business Continuity Preparedness Plans
XV week	Group Presentations, Final research topic presentations Open discussion regarding best practices to insure organizational success with IT.
Final week	Završni ispit
<b>STUDENTS' OBLIGATIONS</b>	
Studenti su obavezni da pohađaju nastavu i vježbe. Studenti rade redovne domaće zadatke, dva kolokvijuma i završni ispit.	
<b>LEARNING OUTCOMES</b>	
Upon completing the course, studente will be able to:	
<ul style="list-style-type: none"> <li>- to understand IT Strategic Planning Process and measurable business benefits deriving from the application of IT/IS in business (key performance indicators- KPI).</li> <li>- to be able to determine what should be contained in IT Strategic plan and how industry standards (COBIT) can assist in determining the overall IT strategy and execution</li> <li>- to be able to make strategic decisions for applicable business/IT solutions through comprehensive analysis of an organisation business requirements and processes ( selecting hardware, software, outsourcing - management of Package Software (Implementation, Enhancement, Conversions and training considerations) and cost/benefits of outsourcing</li> <li>- to understand network economy and innovation in strategic IS planning (moving towards digital organization, Cloud Computing and SaaS Systems)</li> <li>- to be able to apply Project Management techniques and business analytic software in the process of strategic decision making</li> <li>- to understand Systems Development priority setting criteria and Quality and Productivity Process ( CMU's Comparability Maturity Model CMMi, ITIL, and ISO)</li> <li>- to understand how IT is audited to insure information assets are accurate and protected. planira faze razvoja IS</li> </ul>	
<b>LITERATURE</b>	
<ol style="list-style-type: none"> <li>1. Corporate Information Strategy and Management Text and Cases 8th Edition, Linda M. Applegate, Robert D. Austin, and F. Warren McFarlan, ISBN: 978-0073402932</li> <li>2. Grady J.O. (2015): System Requirements Analysis, Elsevier, ISBN: 978-0-12-417107-7</li> <li>3. Ward J.&amp; Peppard J. (2013): Strategic Planning for Information Systems , Wiley Series in Information Systems, latest edition Cassidy A. A Practical Guide to Information Systems, ISBN: 978-1-118-58525-2</li> <li>4. Pohl K., Rupp C. (2013): Requirements Engineering Fundamentals, Rocky Nook, ISBN-13: 978-1-933952-81-9</li> <li>5. Alexander I.F., Lj.Beus-Dukic Lj. (2009) : Discovering Requirements: How to Specify Products and Services, Wiley, ISBN-13: 978-0-470-71240-5, Online: <a href="https://hientl.files.wordpress.com/2011/12/tnyc_discovering-require.pdf">https://hientl.files.wordpress.com/2011/12/tnyc_discovering-require.pdf</a></li> <li>6. Leffingwell D. (2013): Agile Software Requirements: Lean Requirements Practices for Teams, Programs, and the Enterprise, Addison- Wesley, ISBN: 978-0321635846</li> <li>7. Effective pactices for Modeling and Documentation, Agile Modeling , online: <a href="http://agilemodeling.com/">http://agilemodeling.com/</a></li> <li>8. Various course materials contained in the course Moodle Lecture Notes, Handouts, and Assignment sections. (<a href="http://e-fit.unimediterran.net">http://e-fit.unimediterran.net</a>)</li> </ol>	
<b>ASSESSMENT AND GRADING</b>	
<ul style="list-style-type: none"> <li>- Attendance and engagement in classes - 5 points</li> <li>- Mid term exam I (Individual student research case and class presentations) – 25 points</li> <li>- Mid term exam II (Individual student research case and class presentations) - 25 points</li> <li>- Final exam (final project and presentation) - 45 points</li> </ul>	
Final exam is obligatory for all students. The final exam is passed if student acquires min 25 points for final	

project and presentation.  
The course is passed if the student cumulatively collects a minimum of 51 points by passing the final exam and exams during the semester

Special Remark for the Course: N/A

The teacher who prepared the course information sheet:

Snežana Šćepanović, Full prof.

<b>WIRELESS NETWORKS</b>				
GENERAL INFORMATION				
Course code:	BIK3010	Professor:	Doc. dr Maja Delibašić	
Course status:	Elective	Teaching Assistant:		
Study year:	2.	Office hours:	By appointment	
Semester:	III (winter)	Study programme:	Academic master studies Information Technology	
ECTS:	10			
SCHEDULE				
Lectures		Seminars		Lab
32 (2 per week)		32 (2 per week)		16 (1 per week)
STUDENTS' WORKLOAD				
	Weekly	During the semester	Total during the semester:	
Lectures	2:00 h	32:00 h	Lessons and final exam:	213:20 h
Seminars	2:00 h	32:00 h	Required preparation for enrolment and semester verification	26:40 h
Labs	1:00 h	16:00 h		
Individual work and utilizing office hours	8:20 h	133:20 h	Preparation for and taking exams in additional exam term	60:00 h
Total:	13:20 h	213:20 h	Total:	300:00 h
COURSE DESCRIPTION				
Prerequisites: None				
Objectives: This course is focused on the getting acquainted with various wireless technologies, their architecture and applications. Students will be also introduced the needed changes in network and transport layer protocols for wireless networks.				
Teaching and learning methods: Lectures, homeworks, mid-term exams, and final exam. Office hours.				
COURSE CONTENT				
Preparation week	Preparation and semester enrolment			
I week	Introduction to wireless networks. Wireless revolution, historical development, requirements and challenges; types of signals; wireless signal transmission.			
II week	Wireless communication system elements; bandwidth; capacity; licensed and unlicensed frequency bands.			
III week	Reliable data transfer; quality of service; ARQ mechanisms			
IV week	Adaptive data transfer rate; flow control; buffering.			
V week	IP and TCP for wireless networks			
VI week	WWAN and WMAN networks; architecture; characteristics of the MAC level.			
VII week	One week break			
VIII week	WLAN networks; architecture; protocols; MAC level;			
IX week	WPAN networks; architecture; protocols; application of wireless sensor networks			
X week	WLAN networks; segmentation; extended spectrum technique; WLAN services; comparison with cellular networks			
XI week	Other wireless technologies: Bluetooth, RFID, ...			
XII week	Security in wireless networks			
XIII week	Network Solutions for Smart Grid			
XIV week	Power supply to wireless networks			
XV week	Synthesis of the learned material and work on project			

Final week	Final exam
<b>STUDENTS' OBLIGATIONS</b>	
Students are obliged to attend lectures and seminars. They shall take mid-term exams, and final exam.	
<b>LEARNING OUTCOMES</b>	
Upon completion of the Wireless Network course, the student will be able to:	
<ul style="list-style-type: none"> <li>- Master basic knowledge in the field of wireless networks;</li> <li>- Gain knowledge of mechanisms for reliable data transmission to wireless networks;</li> <li>- Analyze the requirements and define the necessary changes to the network and transport layer protocols;</li> <li>- Gain theoretical knowledge and practical experience in the application of various wireless networks;</li> <li>- Participate in team work for the organization and implementation of the project.</li> </ul>	
<b>LITERATURE</b>	
<ol style="list-style-type: none"> <li>1. Stallings W. (2002): <i>Wireless Communications &amp; Networks (2nd Ed.)</i>. Prentice-Hall, ISBN: 0-13-040864-6</li> <li>2. Beard C., Stallings W. (2015): <i>Wireless Communication Networks and Systems, Global Edition</i>, Pearson, ISBN-13: 978-0133594171</li> <li>3. Schiller J. (2003): <i>Mobile Communications, (2nd Ed.)</i>, Addison-Wesley, ISBN: 0-321-12381-6</li> <li>4. Leon-Garcia A. (2003): <i>Communication Networks (2nd Ed.)</i>, McGraw-Hill, ISBN: 9780072463521</li> <li>5. Teaching materials available at the e-learning web site (<a href="http://e-fit.unimediterranean.net">http://e-fit.unimediterranean.net</a> )</li> </ol>	
<b>ASSESSMENT AND GRADING</b>	
<ul style="list-style-type: none"> <li>- Attending - 0 points</li> <li>- Engagement in classes - 10 points</li> <li>- Mid-term exam I - 15 points</li> <li>- Mid-term exam II - 15 points</li> <li>- Practical work/seminar – 15 points</li> <li>- Final exam - 45 points</li> </ul>	
A student has to pass (acquire more than 50%) each exam: Mid-term exam I, Mid-term exam II, Final exam.	
Special Remark for the Course:	
The teacher who has prepared the course information sheet:	Maja Delibašić, Associate prof.

<b>ADVANCED PROGRAMMING</b>				
<b>GENERAL INFORMATION</b>				
Course code:	BSI201	Professor:	Tijana Vujičić, Associate prof.	
Course status:	Mandatory	Teaching Assistant:	Stanjević Vladimir, Msc.	
Study year:	1.	Office hours:	By appointment	
Semester:	II (summer)	Study programme:	Academic master studies: Information Technology Module: Software engineering	
ECTS:	10			
<b>SCHEDULE</b>				
Lectures	Seminars		Lab	
48 (3 per week)	32 (2 per week)		16 (1 per week)	
<b>STUDENTS' WORKLOAD</b>				
	Weekly	During the semester	Total during the semester:	
Lectures	2:00 h	32:00 h	Lessons and final exam:	213:20 h
Seminars	2:00 h	32:00 h	Required preparation for enrolment and semester verification	26:40 h
Labs	1:00 h	16:00 h		
Individual work and utilizing office hours	8:20 h	131:20 h	Preparation for and taking exams in additional exam term	60:00 h
Total:	13:20 h	213:20 h	Total:	300:00 h
<b>COURSE DESCRIPTION</b>				
Prerequisites:				

N/A	
<b>Objectives:</b> The objective is that students apply all previously acquired knowledge to develop web application that can be integrate in single information system. Special attention will be paid to aspects of security, scalability and maintenance of the whole system.	
<b>Teaching and learning methods:</b> Lectures, seminars, mid-term exams, and final exam. Office hours.	
<b>COURSE CONTENT</b>	
Preparation week	Preparation and semester enrolment
I week	Revision of previous knowledge and selection of project topic
II week	Security concepts during web application and web services development
III week	Web application development with focus on maintenance and upgrade
IV week	Installation, configuration and fundamentals of Laravel PHP framework
V week	Advantages of Laravel framework
VI week	Development of practical project, first part
VII week	One-week break
VIII week	Introduction into development of Java Enterprise web applications
IX week	Fundamentals of Java Enterprise web application development
X week	Security concepts and methodology of Java Enterprise web application and services development
XI week	Similarities and differences between developing web application and services in PHP and Java Enterprise programming languages
XII week	Development of practical project, second part
XIII week	Development of practical project, third part
XIV week	All materials synthesis
XV week	All materials synthesis
Final week	Final exam
<b>STUDENTS' OBLIGATIONS</b>	
Students are obliged to attend lectures and seminars. They shall take mid-term exams, and final exam.	
<b>LEARNING OUTCOMES</b>	
Upon completion of this course, learners will be able to:	
<ul style="list-style-type: none"> <li>- Develop advanced web applications;</li> <li>- Develop secure web services;</li> <li>- Develop enterprise applications.</li> </ul>	
<b>LITERATURE</b>	
<ol style="list-style-type: none"> <li>1. Conolly R., Hoar R. (2014): <i>Fundamentals of Web development</i>, Pearson, SBN-13: 978-0133407150, ISBN-10: 0133407152</li> <li>2. Stauffer M. (2016): <i>Laravel: Up and Running: A Framework for Building Modern PHP Apps</i>, O'Reilly, SBN-13: 978-1491936085, ISBN-10: 1491936088</li> <li>3. Heffelfinger D.R. (2017): <i>Java EE 8 Application Development</i>, Packt, ISBN-10: 1788293673, ISBN-13: 978-1788293679</li> <li>4. Teaching materials available at the e-learning web site (<a href="http://e-fit.unimediteran.net">http://e-fit.unimediteran.net</a> )</li> </ol>	
<b>ASSESSMENT AND GRADING</b>	
<ul style="list-style-type: none"> <li>- Attending - 0 points</li> <li>- Engagement in classes - 10 points</li> <li>- Mid-term exam I - 25 points</li> <li>- Mid-term exam II - 25 points</li> <li>- Final exam - 40 points</li> </ul>	
A student has to pass (acquire more than 50%) each exam: Mid-term exam I, Mid-term exam II, Final exam.	
<b>Special Remark for the Course:</b>	
The teacher who has prepared the course data:	Tijana Vujičić, Associate prof.

<b>SOFTWARE TESTING AND SOFTWARE QUALITY</b>				
GENERAL INFORMATION				
Course code:	BSI3007	Professor:	Filip Marković, Associate prof.	
Course status:	Elective	Teaching Assistant:		
Study year:	2.	Office hours:	By appointment	
Semester:	III (winter)	Study programme:	Academic master studies:	
ECTS:	10		Information Technology Module: Software engineering	
SCHEDULE				
Lectures		Seminars		Lab
32 (2 per week)		32 (2 per week)		16 (1 per week)
STUDENTS' WORKLOAD				
	Weekly	During the semester	Total during the semester:	
Lectures	2:00 h	32:00 h	Lessons and final exam:	213:20 h
Seminars	2:00 h	32:00 h	Required preparation for enrolment and semester verification	26:40 h
Labs	1:00 h	16:00 h		
Individual work and utilizing office hours	8:20 h	131:20 h	Preparation for and taking exams in additional exam term	60:00 h
Total:	13:20 h	213:20 h	Total:	300:00 h
COURSE DESCRIPTION				
Prerequisites: Programming and software design.				
Objectives: The objective of course is to enable students to acquire knowledge of advanced concepts of software quality control and software testing, on theoretical and practical level. Theory will be applied on practical example using software testing tools.				
Teaching and learning methods: Lectures, seminars, mid-term exams, and final exam. Office hours.				
COURSE CONTENT				
Preparation week	Preparation and semester enrolment			
I week	Term and definition of software testing			
II week	Basic software testing questions			
III week	Levels, subjects and goals of software testing			
IV week	Software testing techniques			
V week	Unit testing - fundamentals			
VI week	Unit testing - tools			
VII week	One-week break			
VIII week	Unit testing - advanced techniques			
IX week	Integrational testing - fundamentals			
X week	Integrational testing - tools			
XI week	Integrational testing - advanced techniques			
XII week	Criteria for ending testing			
XIII week	Specification and grading			
XIV week	All materials synthesis			
XV week	Development of practical project			
Final week	Final exam			
STUDENTS' RESPONSIBILITIES				
Students are obliged to attend lectures and seminars. They shall take mid-term exams, and final exam.				
LEARNING OUTCOMES				
Upon completion of this course, learners will be able to:				
<ul style="list-style-type: none"> <li>- Explain basic concepts of software testing;</li> <li>- Choose and apply appropriate software testing technique;</li> <li>- Design and implement chosen software testing technique;</li> <li>- Apply acquired knowledge to solve real-world problems.</li> </ul>				
LITERATURE				

1. Koskela L. (2007) : *Test Driven: Practical TDD and Acceptance TDD for Java Developers*, Manning, ISBN-10: 1932394850, ISBN-13: 978-1932394856
2. Tachiev P. (2010): *Junit in Action*, Manning, ISBN-10: 1935182021, ISBN-13: 978-1935182023
3. Teaching materials available at the e-learning web site (<http://e-fit.unimediteran.net> )

#### ASSESSMENT AND GRADING

- Attending - 0 points
- Engagement in classes - 10 points
- Mid-term exam I - 25 points
- Mid-term exam II - 25 points
- Final exam - 40 points

A student has to pass (acquire more than 50%) each exam: Mid-term exam I, Mid-term exam II, Final exam.

#### Special Remark for the Course:

The teacher who prepared the course information sheet:

Filip Marković, Associate prof.