

## Specification for the book of courses

<b>Study program</b>		Computing and Informatics		
<b>Module</b>		Software Engineering		
<b>Type and level of studies</b>		Master studies		
<b>The name of the course</b>		Interoperability and Information Integration		
<b>Lecturer (for lectures)</b>		Stoimenov V. Leonid, Nejković M. Valentina		
<b>Lecturer/associate (for exercises)</b>		Bogdanović D. Miloš		
<b>Lecturer/associate (for OFE)</b>				
<b>Number of ECTS</b>	4	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
<b>Course objectives</b>				
The need for information integration and the need for realization of applications and systems interoperability. Introduction to problems regarding information integration and learning technologies for realization of system integration and interoperability.				
<b>Course outcomes</b>				
Theoretical and practical knowledge regarding concepts, methods of solving, designing and implementation of basic elements of system interoperability and information integration.				
<b>Course outline</b>				
<b>Theoretical teaching</b>				
Introduction to the problem of information integration. Heterogeneity problems and solving methods: technical, syntax, semantic. Architecture for information integration. Ontology and semantic heterogeneity. Ontology construction. Semantic heterogeneity, ontology types used for information integration, ontology mapping. Interoperability of applications and systems. Approaches and platforms for the implementation of interoperability. Interoperability implementation Technologies: Enterprise Service Bus, Service-Oriented Architecture. Standards and their importance regarding the implementation of interoperability. Ontologies of Open Data and Web Portals used as access points towards integrated information. Open data and semantic interoperability of systems based on open data.				
<b>Practical teaching (exercises, OFE, study and research work)</b>				
Practical implementation of simple examples of information integration that demonstrate the existence of heterogeneity problems and their resolution at the technical and syntax level. Usage of open ESB systems for implementation of heterogeneity solution at syntax and technical level (Mule ESB). Implementation of the mapping between ontologies. Implementation of mechanisms for determining the semantic similarity of ontologies. Implementation of mechanisms for determining the semantic heterogeneity based on data analysis and data structure used within the system. Implementation of the interoperability of the ESB-based system and service-oriented architecture. Usage of open data for the integration of heterogeneous systems. Determining the semantic similarity of the open data ontologies.				
<b>Textbooks/references</b>				
1	V. E. Ferraggine, J.H. Doorn, L.C. Rivero (Eds.) Handbook of Research on Innovations in Database Technologies and Applications: Current and Future Trends (2-volumes), ISBN: 978-1-60566-242-8, Publisher: Information Science Reference, February 2009, Pages: 1,124, pp. 491-507.			
2	R. Emasri, S. Navathe, Fundamentals of Database Systems, Addison-Wesley; 6 edition (2010), ISBN-10: 0136086209, ISBN-13: 978-0136086208			
3	A. Sheth, Semantic Services, Interoperability and Web Applications: Emerging Concepts, 2011, ISBN: 978-1609605933, Publisher: IGI Global			
4	J. T. Pollock, R. Hodgson, Adaptive Information: Improving Business Through Semantic Interoperability, Grid Computing, and Enterprise Integration, 2004, ISBN: 978-0471488545, Publisher: John Wiley & Sons, Inc., New Jersey			
5	Scientific papers available on the Web			
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
2	1	0		
<b>Teaching methods</b>				
Lectures, exercises, homework assignments and projects				
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>		<b>Points</b>	<b>Final exam</b>	<b>Points</b>
<b>Activity during lectures</b>			<b>Written exam</b>	
<b>Exercises</b>		30	<b>Oral exam</b>	30
<b>Colloquia</b>		30		
<b>Projects</b>		10		