

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Electronics - Electronic Circuits and Embedded Systems		
<b>Type and level of studies</b>		Undergraduate Academic Studies		
<b>The name of the course</b>		Thermovision		
<b>Lecturer (for lectures)</b>		Mančić D. Dragan		
<b>Lecturer/associate (for exercises)</b>		Jovanović D. Igor		
<b>Lecturer/associate (for OFE)</b>		Jovanović D. Igor		
<b>Number of ECTS</b>	5	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
<b>Course objectives</b>	Acquiring the fundamental knowledge about thermovision and practical application of a thermal imaging camera.			
<b>Course outcomes</b>	Theoretical knowledge on the fundamentals of thermovision. Mastering the technique of recording and interpretation of the results of thermal imaging inspections.			
<b>Course outline</b>				
<b>Theoretical teaching</b>	Introduction to thermal imaging. Theory of infrared radiation. Detection of infrared radiation and temperature measurement. Devices for temperature measurement. Operation principle and types of thermal imaging cameras. Practical aspects of thermal imaging cameras. Application of thermal imaging in a preventive maintenance and testing in various areas. Processing and analysis of thermal images.			
<b>Practical teaching (exercises, OFE, study and research)</b>	Thermal imaging camera Varioscan 3021ST. Thermal imaging inspection of electronic devices. Thermal imaging inspection of energy efficiency of buildings. Thermal imaging inspection of the power grid. Thermal imaging inspection of a thermal pipeline system. Thermal imaging inspection of patients in medicine. Processing of thermal images using Irbis software.			
<b>Textbooks/references</b>				
1	M.Vollmer, K.P.Möllmann, "Infrared Thermal Imaging: Fundamentals, Research and Applications", Wiley – VCH, 2018.			
2	D.Lanzoni, "Infrared Thermography: electrical and industrial applications", CreateSpace Independent Publishing Platform, 2015.			
3	W.Minkina, S.Dudzik, "Infrared Thermography – Errors and Uncertainties", Wiley, 2009.			
4	Z.Barbaric, "Thermovision - formation and application of thermovision image" (in Serbian), Akademik mind, Belgrade, 2014.			
5				
<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	2	1	0	0
<b>Teaching methods</b>	Lectures; Auditorial exercises; Laboratory exercises; Computer exercises; Consultations.			
<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>	10	<b>Written exam</b>	20	
<b>Exercises</b>	15	<b>Oral exam</b>	20	
<b>Colloquia</b>	20			
<b>Projects</b>	15			