

RTU Course "Electro-Magnetic Compatibility in Industrial Electronic Equipment"

33000 Faculty of Computer Science, Information Technology and Energy

General data

Code	EEP581
Course title	Electro-Magnetic Compatibility in Industrial Electronic Equipment
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Leonīds Ribickis
Academic staff	Gundars Ašmanis
Volume of the course: parts and credits points	1 part, 3.0 credits
Language of instruction	LV, EN
Annotation	Study course covers industrial electronics electromagnetic compatibility, providing deep knowledge in equipment testing and European Union legislation. Special attention is paid to methods of troubleshooting and development to solve electromagnetic compatibility problems. During the study course, part of studies is kept in an accredited testing laboratory to gain insight into equipment testing before placing electronic equipment on the market.
Goals and objectives of the course in terms of competences and skills	<p>Goals of the study course:</p> <ol style="list-style-type: none"> 1. To provide basic knowledge in the field of electromagnetic compatibility. 2. To introduce with new products development stages related to electromagnetic compatibility testing and certification. <p>Objectives of the study course:</p> <ol style="list-style-type: none"> 1. Introduce students to legislation in the European Union and Latvia in the field of electromagnetic compatibility, in accordance with 2014/30/EU Directive and Latvian MK No 208. 2. To provide an insight into the assessment of the electromagnetic compatibility documentation according to the harmonised standards. 3. To introduce electromagnetic compatibility testing methods to which industrial electronic equipment is subjected before placing on the market. 4. To introduce troubleshooting and development methods applicable in cases when electromagnetic compatibility testing has revealed non-compliance (filtering, shielding, component integration, wiring, design of mechanical components). 5. To provide insight into alternative testing methods applicable during the development of industrial electronic equipment. 6. To develop the ability of students to independently assess and evaluate testing and measurement results.
Structure and tasks of independent studies	Self-dependent work, preparation for final exam.
Recommended literature	<p>Obligāta/Obligatory</p> <ol style="list-style-type: none"> 1. C. R. Paul. Electromagnetic Compatibility. Second Edition. John Wiley & Sons, 2006. 975 p. 2. G.Ašmanis L.Ribickis Elektromagnētiskā savietojamība. - Rīga:RTU. 2010, 222 lpp
Course prerequisites	Knowledge of the theoretical basics of electrical engineering, electronic devices and power electronics.

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Electromagnetic compatibility. Character of electro-magnetic interference.	2	0	0	0
Legislation (Latvian, EU, EMC directive, standards).	2	4	0	0
Emission of harmonic components, emitted controllability interference.	2	4	0	0
Interference emitted in the ether.	2	4	0	0
Measurements of harmonic components of current, emitted controllability interference.	2	4	0	0
ESD pulse-type interference immunity, Surge, EFT/Burst, industrial frequency magnetic field immunity.	2	4	0	0
Controllability interference immunity.	2	4	0	0
ESD, Surge, EFT/Burst, industrial frequency magnetic field immunity.	2	4	0	0
Shielding, grounding, filters.	2	4	0	0
Standard EN 61800-3 „Systems of electric drive with changing rotation speed”.	2	2	0	0
Problems of EMC in printed circuit boards in digital control systems.	2	4	0	0
Problems of EMC in printed circuit boards in digital control systems.	2	2	0	0
Shielding, grounding, filters.	2	4	0	0
Problems of EMC in printed circuit boards in digital control systems.	2	2	0	0
Information summarizing, tutorial.	2	2	0	0
Exam.	2	0	0	0
Total:	32	48	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
Is able to orientate in EU and Latvian EMC legislation.	Homework.
Is able to analyse technical documentation regarding EMC issues.	Homework.
Is familiar with EMC testing methods and equipment.	Homework.
Is able to troubleshoot and develop industrial equipment with EMC issues.	Homework, exam.

Evaluation criteria of study results

Criterion	%
Completed home works	50
Passed exam	50
Total:	100

Study subject structure

Part	CP	Hours			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	2.0	0.0	0.0		*	