



Code WEB/ISVU	22860/22280	ECTS	5.0	Academic year	2018/2019
Name	Power Electronics				
Status	4th semester - Electrical power engineering (Redovni elektrotehnika) - obligatory course 4th semester - Control and computer engineering in automation (Redovni elektrotehnika) - elective course				
Teaching mode	Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home			30+30 (30+0+0+0) 90	
Teachers	Lectures: 2. Željko Stojanović Auditory exercises: Neven Čobanov Auditory exercises: Željko Stojanović				
Course objectives	students will acquire knowledge in power electronics				
Learning outcomes:	1. ability to classify electrical components according to their conversion properties. Level: 6,7 2. ability to distinguish between particular types of converters. Level: 6 3. ability to analyze basic DC converter circuits. Level: 6 4. ability to analyze basic rectifier circuits. Level: 6 5. ability to comment influence of rectifier on mains. Level: 6 6. ability to analyze basic inverter circuits. Level: 6				
Methods of carrying out lectures	Ex cathedra teaching Case studies Demonstration Discussion Questions and answers All topics are explained and illustrated by means of characteristic examples.				
Methods of carrying out auditory exercises	Group problem solving Discussion, brainstorming Other Solving problems and discussion of results. Visit to the power electronic factory "Kon"				
Course content lectures	1. Power converters. Basic properties of power converters, 2h, Learning outcomes: 1 2. Concept of a power conversion device. Constitutive devices and topology of power converters, 2h, Learning outcomes: 1,3,4,5 3. Power semiconductor devices, 2h, Learning outcomes: 1,3,4,5 4. Development of uncontrolled switches, unilateral current switches, unilateral voltage switches, bilateral switches, 2h, Learning outcomes: 1,3,4,5 5. DC converters, 2h, Learning outcomes: 1,2,3 6. One-quadrant direct and indirect dc converters., 2h, Learning outcomes: 1,2,3 7. Isolated DC converters, 2h, Learning outcomes: 1,2,3 8. Four-quadrant DC converters, 2h, Learning outcomes: 1,2,3 9. Rectifiers. Uncontrolled rectifiers, 2h, Learning outcomes: 1,2,4 10. Uncontrolled rectifiers. Single phase bridge rectifier with RL load., 2h, Learning outcomes: 1,2,4 11. Uncontrolled rectifiers. Single phase bridge rectifier with RL and RC load., 2h, Learning outcomes: 1,2,4 12. Uncontrolled rectifiers. Three phase rectifier with RL load., 2h, Learning outcomes: 1,2,4 13. Influence of rectifiers on AC network and its suppression, 2h, Learning outcomes: 1,2,4 14. Autonomous voltage-stiff inverters, 2h, Learning outcomes: 1,2,5 15. Reduction of input current harmonic, 2h, Learning outcomes: 1,2,5				
Course content auditory	1. Visit to the power electronics factory, 2h, Learning outcomes: 2 2. Repetition: commutation laws, average and effective value, 2h, Learning outcomes: 3,4,5 3. Power converters. Basic properties of power converters, 2h, Learning outcomes: 1 4. Development of uncontrolled switches, unilateral current switches, unilateral voltage switches, bilateral switches, 2h, Learning outcomes: 1,3,4,5 5. DC converters, 2h, Learning outcomes: 1,2,3 6. One-quadrant direct dc converters., 2h, Learning outcomes: 1,2,3 7. One-quadrant direct and indirect dc converters., 2h, Learning outcomes: 1,2,3 8. Isolated DC converters, 2h, Learning outcomes: 1,2,3 9. Four-quadrant DC converters, 2h, Learning outcomes: 1,2,3 10. Isolated DC converters, 2h, Learning outcomes: 1,2,4 11. Uncontrolled rectifiers, 2h, Learning outcomes: 1,2,4 12. Uncontrolled rectifiers, 2h, Learning outcomes: 1,2,4 13. Influence of rectifiers on AC network and its suppression, 2h, Learning outcomes: 1,2,4 14. Autonomous voltage-stiff inverters, 2h, Learning outcomes: 1,2,5 15. Autonomous voltage-stiff inverters, 2h, Learning outcomes: 1,2,5				
Required materials	Basic: classroom, blackboard, chalk... Whiteboard with markers				
Exam literature	Basic literature: 1. I. Flegar, Elektronički energetska pretvarači, Kigen, Zagreb, 2010 Additional literature: 1. K. Thorborg, Power electronics, Prentice Hall, New York, 1988 2. R. W. Erickson, D. Maksimovic, Fundamentals of power electronics, Springer, 2001 3. I. Flegar, Sklopovi energetske elektronike, Graphis, Zagreb, 1996				
Students obligations	Minimum of 25% of total points achieved on attendance and partial exams.				
Knowledge evaluation during semester	Attendance-maximum 10% of points on partial exams. Two partial exams. Numerical problems (about 80%) and theory (about 20%).				



	Grades: - 0 - 50% #8594; 1 , not passed - 50 - 64% #8594; 2 , passed - 64 - 80% #8594; 3 , passed - 80 - 90% #8594; 4 , passed - 90 - 100% #8594; 5 , passed						
Knowledge evaluation after semester	Written exam and oral exam. Minimum of 50% on written exam is required for oral exam. Optional seminar work.						
Student activities:	<table><tr><td>Aktivnost</td><td>ECTS</td></tr><tr><td>(Constantly tested knowledge)</td><td>4</td></tr><tr><td>(Classes attendance)</td><td>1</td></tr></table>	Aktivnost	ECTS	(Constantly tested knowledge)	4	(Classes attendance)	1
Aktivnost	ECTS						
(Constantly tested knowledge)	4						
(Classes attendance)	1						
Remark	This course can be used for final thesis theme						
Prerequisites:	No prerequisites.						
Proposal made by	Željko Stojanović						