

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Electronics - Electronic Circuits and Embedded Systems		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Automotive Electronics		
Lecturer (for lectures)		Petrović D. Branislav		
Lecturer/associate (for exercises)		Nikolić S. Goran		
Lecturer/associate (for OFE)		Nikolić S. Goran		
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Getting to know the general structure of cars with internal combustion engines, electrical devices in the car and the principles of engine control. Getting acquainted with modern electric and hybrid cars and methods for car diagnostics.			
Course outcomes	Knowledge about electrical and electronic devices in the car. Knowledge of electric and hybrid cars. Application and analysis of data from diagnostic devices.			
Course outline				
Theoretical teaching	Basic principles of car operation - physical configuration, engine, power transmission, suspension, braking and steering systems. Automobile control and instrumentation systems - analog and digital systems, open and closed loop systems. Microprocessor instrumentation and control. Electronic engine control. Sensors and actuators in the car - MAF, exhaust gases, butterfly position, RPM, engine temperature, air temperature in the suction line, MAP, exhaust pressure, vehicle speed. Digital engine control systems - fuel consumption, EGR control, valve control, electronic ignition. Vehicle control, ABS, Electronic Suspension, Electronic Tuning. Instrumentation and telemetry - communication systems, interfaces and standards. Diagnostics. Trends in the development of electronic systems in the car. Electric cars: Energy sources, battery types, parameters and characteristics. DC and AC motors, three-phase motors, vector representation, permanent magnet motors. Electronics for engine motions, power components. Hybrid vehicles.			
Practical teaching (exercises, OFE, study and research)	Basic measurement methods on the automobile engine. Measurement of the moment. Temperature measurement. Pressure measurement. Measurement of air flow. Electronic ignition. Diagnostic devices. Analysis of Diagnostic Protocols. Connecting to a PC. Engine management.			
Textbooks/references				
1	"Autoelectronics", auxiliary teacher textbook in manuscript (in Serbian).			
2	Selected articles. Diagnostic device documentation.			
3	Bosch Automotive Electrics and Automotive Electronics, Robert Bosch GmbH			
4	ELECTRIC and HYBRID VEHICLES, Design Fundamentals, Iqbal Husain, CRC PRESS			
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	1	0	0
Teaching methods	Auditory instruction using computers and projectors. Basic examples of system simulation. Lectures. Practical exercises. Laboratory exercises. Homework. Colloquiums. Seminary work. Consultations.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures	10	Written exam	20	
Exercises	15	Oral exam	20	
Colloquia	20			
Projects	15			