Faculty of Mechanical Engineering / MECHANICAL ENGINEERING / ELECTRICAL ENGINEERING

Course:	ELECTRICAL ENGINEERING			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
917	Mandatory	3	5	2+2+0
Programs	MECHANICAL ENGINEERING			
Prerequisites				
Aims				
Learning outcomes	After passing the exam in this subject, the student will be able to: 1. Define the concept of electrostatic field and the basic quantities that describe it. 2. Define the concept of a linear electrical circuit and the basic laws that describe it (Ohms law, Joules law, Kirchhoffs laws) and solve a direct current circuit. 3. Describe phenomena in the magnetic field and their applications. 4. Describe the behavior of resistors, inductors, and capacitors in an alternating current circuit. 5. Explain the operating principle and basic characteristics of transformers, asynchronous machines, and direct current machines. 6. Explain the operation of basic electronic circuits. 7. Solve standardized problems and analyze the obtained solutions.			
Lecturer / Teaching assistant				
Methodology				
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Electrostatic field and the basic quantities that describe it. Coulombs law. Conductors in electric field. Gausss law. Electrostatic induction.			
I week exercises	Electrostatic field and the basic quantities that describe it. Coulombs law. Conductors in electric field. Gausss law. Electrostatic induction.			
II week lectures	Electric capacitance and capacitors. Dielectric in electric field. Electrostatic energy.			
II week exercises	Electric capacitance and capacitors. Dielectric in electric field. Electrostatic energy.			
III week lectures	Constant direct current. Electromotive force. Resistors. Ohms law. Joules law.			
III week exercises	Constant direct current. Electromotive force. Resistors. Ohms law. Joules law.			
IV week lectures	Kirchhoffs law. Electric circuits. Methods of circuit analysis.			
IV week exercises	Kirchhoffs law. Electric circuits. Methods of circuit analysis.			
V week lectures	Concept of stationary magnetic field. Vector of magnetic flux density. Biot-Savart law. The theorem on the conservation of magnetic flux. Amperes law. Ferromagnetic materials. Generalized Amperes law. Magnetic circuits.			
V week exercises	Vector of magnetic flux density. Biot-Savart law. The theorem on the conservation of magnetic flux. Amperes law. Ferromagnetic materials. Generalized Amperes law. Magnetic circuits.			
VI week lectures	Faradays law of electromagnetic industion. Self and mutual induction coefficients. Principles of electromechanical energy conversion.			
VI week exercises	Faradays law of electromagnetic industion. Self and mutual induction coefficients. Principles of electromechanical energy conversion.			
VII week lectures	Mid-term exam			
VII week exercises	Mid-term exam			
VIII week lectures	Basic concept of simple periodic quantities. RMS value. Alternating current phasor representation. Resistor, capacitor and inductor in AC circuits.			
VIII week exercises	RMS value. Alternating current phasor representation. Resistor, capacitor and inductor in AC circuits.			
IX week lectures	Simple and complex electrical circuits. General equations. Circuit solution by means of phasor diagram. Introduction to complex analysis of AC circuits - solving an AC circuit using complex effective representatives.			
IX week exercises	Simple and complex electrical circuits. General equations. Circuit solution by means of phasor diagram. Introduction to complex analysis of AC circuits - solving an AC circuit using complex effective representatives.			
X week lectures	Electric power generation and transmission system. Symmetrical three-phase circuits.			

X week exercises	Electric power generation and transmission system. Symmetrical three-phase circuits.
XI week lectures	Electrical machines and transformers. Basic construction, principles of operation and applications.
XI week exercises	Electrical machines and transformers. Basic construction, principles of operation and applications.
XII week lectures	Rotating magnetic field. Asynchronous machines.
XII week exercises	Rotating magnetic field. Asynchronous machines.
XIII week lectures	Durect-current machines.
XIII week exercises	Durect-current machines.
XIV week lectures	Electronics. Semiconductors. Diodes. Transistors. Rectifiers. Amplifiers. Inverters. Converters. Logic circuits.
XIV week exercises	Electronics. Semiconductors. Diodes. Transistors. Rectifiers. Amplifiers. Inverters. Converters. Logic circuits.
XV week lectures	Electrical measuring instruments. Measurment of current, voltage, resistance and power.
XV week exercises	Electrical measuring instruments. Measurment of current, voltage, resistance and power.
Student workload	

Per week	**Per semester**
5 credits x 40/30=6 hours and 40 minuts 2 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises **2 hour(s) i 40 minuts** of independent work, including consultations	Classes and final exam: **6 hour(s) i 40 minuts x 16 =106 hour(s) i 40 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **6 hour(s) i 40 minuts x 2 =13 hour(s) i 20 minuts** Total workload for the subject: **5 x 30=150 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **30 hour(s) i 0 minuts** Workload structure: **106 hour(s) i 40 minuts (cources), 13 hour(s) i 20 minuts (preparation), 30 hour(s) i 0 minuts (additional work)**
Student obligations	
Consultations	
Literature	
Examination methods	
Special remarks	
Comment	

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points