

Course title: Electrotechnics (for mechatronics)

ECTS credit allocation (and other scores): 5

Semester: autumn

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 30+30

Course coordinator/ Department and e-mail: Maciej Neugebauer, Department of Electrical, Power, Electronic and Control Engineering, mak@uwm.edu.pl

Type of classes: classes and lectures

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#### Substantive content

**CLASSES:** Measurements in DC circuits. Ohm's law for direct current. Measurements of currents and voltage drops in AC circuits RLC series and parallel. Calculation of active, reactive and apparent power of alternating current, drawing vector diagrams of currents and voltages. Measurements of active power and electric current energy in single-phase circuits. Measurements in three-phase symmetrical and unbalanced circuits, four and three-wire - active, reactive and apparent power of three-phase systems. Asynchronous squirrel-cage electric motors. TNC, TNS and TNC-S networks. Electric lighting.

**LECTURES:** Basic concepts and laws of electrical engineering. Electric charge. Electric current. Voltage. Ohm's law and Kirchoff's law for direct and alternating current. DC power and energy. Single-phase alternating current. RLC circuits. Vector charts for complex RLC circuits. AC power. Active, reactive and apparent power. Three-phase current. Types of power networks - TT, TNC, TNS, TNC-S, IT. Electrical machinery, equipment, installations. Selection of cables. Protection against short-circuits and overloads. Protection against electric shock and the effects of electric current flow on the human body.

**Learning purpose:** Ability to work with educated electricians in designing and repairing technical devices.

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On completion of the study programme the graduate will gain:

**Knowledge:** Know the basic concepts and mathematical description used in electrotechnics.

**Skills:** Ability to solve AC and DC circuits, analyzes electrical diagrams Can do them practically.

**Social Competencies:** Understands the need to learn and improve throughout their professional career.

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**Basic literature:** A. Szumanowski, Basics of Electrical Engineering, Electrotechnics, Electronics and Electric Machines, Oficyna Wydawnicza Politechniki Warszawskiej, 2019; J. Henderson, Electrotechnics, Kessinger Publishing, 2007

**Supplementary literature:** Sawicki A., Piechocki J., Orliński J., Laboratorium z elektrotechniki dla mechaników, Wyd. UWM, 2001

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The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 64

Student's independent work: 64