
Course title: ELECTROTECHNICS I

ECTS credit allocation (and other scores): 3

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: 15+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

Substantive content

CLASSES: Calculation of DC circuits. Power balance. Calculation of AC circuits - single-phase with the use of complex variable calculus; phasor charts. Counting three-phase circuits connected in a triangle and a whistle with the use of complex variable calculus; phasor charts.

Measurements in series and parallel DC and AC circuits. Measurements of power and active energy in single-phase circuits and in three-phase circuits. Three-phase circuits connection systems, measurements of currents and voltages in various cases - receiver connected in a delta and a star. Study of magnetically coupled circuits.

LECTURES: Basic laws of electrical engineering. DC circuits, selection of shunts and couplers. Single-phase circuits. Phasor charts. Three-phase alternating current circuits - calculation and phasor diagrams. Electric current power (direct and alternating)

Power and energy in single-phase circuits. The essence of the phenomenon of resonance - resonance of voltages and resonance of currents. Three-phase systems. The problem of reactive power compensation. Transient states analysis and consequences resulting from them.

Learning purpose: Theoretical electrotechnics basis, circuit analysis, the ability to connect electric circuits.

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.

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., Piechgocki J., Orliński J., Laboratorium z elektrotechniki dla mechaników, Wyd. UWM, 2001

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 92

Student's independent work: 81