
Course title: ELECTRONICS (FOR POWER ENGINEERING)

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: 60

Course coordinator/ Department and e-mail: Seweryn Lipiński; Department of Electrical Engineering, Power Engineering, Electronics and Automation; seweryn.lipinski@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Health and safety rules, basics of metrology in electronics, designing and simulation of linear power supplies, designing electrical signal generators, analysis and simulation of circuits based on operational amplifiers, designing active filters using operational amplifiers, digital circuits minimalization, implementing and testing combination circuits, designing digital counters with cycle shortening, projects using integrated circuits, prototyping electronics circuits with the use of breadboards, PLC programming, prototyping digital systems with the use of hardware description languages.

LECTURES: Designing power supplies (linear and switching), basic configurations of operational amplifiers (inverting and non-inverting amplifier, integrator and differentiator, etc.), active filters, AD and DA converters, ladder logics, basics of Boolean algebra, Boolean functions, logic gates, methods of logic functions minimalization (Karnaugh maps), designing combinational circuits, arithmetic circuits, encoders, decoders, transcoders, designing sequential circuits (flip-flops), designing synchronous and asynchronous counters, projects using integrated circuits, hardware description languages.

Learning purpose: Gaining the basics of knowledge about the operation and design of electronic devices.

On completion of the study programme the graduate will gain:

Knowledge: Knowledge of the design and analysis of analog and digital electronic circuits.

Skills: Ability to design and test a simple electronic circuit (analog or digital).

Social Competencies: Understanding the need for lifelong learning and ability to work in a team.

Basic literature: Horovitz P., Hill W.: The Art of Electronics, Cambridge University Press, 2015; Mano M.M., Kime C., Martin T.: Logic & Computer Design Fundamentals, Pearson, 2015.

Supplementary literature: Giblisco S.: Beginner's Guide to Reading Schematics, McGraw-Hill Education, 2018; Sherz P., Monk S.: Practical Electronics for Inventors, McGraw-Hill Education, 2016.

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 60

Student's independent work: 65