**COURSE DESCRIPTION CARD**

|  |
| --- |
| **Faculty of Electrical Engineering** |
| **Field of study** | **Electrical and Electronics Engineering** | **Degree level and programme type** | **bachelor’s degree** |
| **Specialization/ diploma path** | **-** | **Study profile** | - |
| **Course name** | **Electronics 1** | **Course code** | **IS-FEE-10006W** |
| **Course type** | **elective** |
| **Forms and number of hours of tuition**  | **L** | **C** | **LC** | **P** | **SW** | **FW** | **S** | **Semester** | **winter** |
| **15** | **15** | **30** |  |  |  |  | **No. of ECTS credits** | **6** |
| **Entry requirements** | Electrical Circuits 1 |
| **Course objectives** | To provide students with basic knowledge of electronic devices. To develop skills in analysis, design and testing of electronic circuits containing diodes, transistors and operational amplifiers. |
| **Course content** | Diodes – parameters, I-V characteristics, DC and AC models. Simple circuits containing diodes. Transistors (BJT, FET and MOSFET) – principles of operation, I-V characteristics, equivalent circuits. Transistor biasing. Single stage transistor amplifiers. Small signal analysis of amplifiers. Transistor as a switch. Parameters of operational amplifiers. Ideal OpAmp. Basic applications of operational amplifiers. Analysis and design of electronic devices and circuits using PSPICE. |
| **Teaching methods** | lecture, class, laboratory class, computer simulations |
| **Assessment method** | lecture: written exam; class: two tests, laboratory class: evaluation of reports, verification of preparation for classes |
| **Symbol of learning outcome**  | **Learning outcomes** | **Reference to the learning outcomes for the field of study** |
| **LO1** | describes the basic operation, characteristics and applications of diodes, transistors and operational amplifiers |  |
| **LO2** | can apply knowledge of mathematics and engineering to analyze and design circuits containing diodes, transistors and operational amplifiers |  |
| **LO3** | analyzes an electronic circuit using PSpice |  |
| **LO4** | uses laboratory instruments for the measurement of circuit parameters and the data acquisition |  |
| **LO5** | analyzes and interprets measurement data and prepares reports |  |
| **LO6** | uses datasheets and application notes |  |
| **Symbol of learning outcome** | **Methods of assessing the learning outcomes** | **Type of tuition during which the outcome is assessed** |
| **LO1** | written exam, tests | L, LC |
| **LO2** | written exam, tests | L, C, LC |
| **LO3** | verification of preparation for classes | LC |
| **LO4** | tests, evaluation of class work | LC |
| **LO5** | evaluation of reports | LC |
| **LO6** | evaluation of class work | LC |
| **Student workload (in hours)** | **No. of hours** |
| **Calculation** | lecture attendance | 15 |
| participation in classes | 15 |
| preparation for classes | 15 |
| participation in laboratory classes | 30 |
| preparation for laboratory classes | 20 |
| working on projects, reports | 25 |
| participation in student-teacher sessions related to the classes/laboratory classes | 5 |
| preparation for and participation in exams/tests | 25 |
| **TOTAL:** | 150 |
| **Quantitative indicators** | **HOURS** | **No. of ECTS credits** |
| **Student workload – activities that require direct teacher participation** | 65 | 2,6 |
| **Student workload – practical activities** | 110 | 4,4 |
| **Basic references** | 1. Sedra A.S., Smith K. C.: Microelectronic Circuits. Oxford University Press, 2004.
2. Muret P.: Fundamentals of Electronics 1 : Electronic Components and Elementary Functions, John Wiley & Sons, Inc., 2017 (Available from: ProQuest Ebook Central)
 |
| **Supplementary references** | 1. Boysen E., Kybett H.: Complete Electronics Self-Teaching Guide with Projects, John Wiley & Sons, Inc., 2012 (Available from: ProQuest Ebook Central)
2. Singh S.: Electronics Engineering, Alpha Science International, New Delhi, 2014 (Available from: ProQuest Ebook Central)
3. Westcott S., Westcott J.R.: Basic Electronics: Theory and Practice, Mercury Learning & Information, 2015 (Available from: ProQuest Ebook Central)
4. Saggio G.: Principless of analog electronic. CRC Press, 2014.
 |
| **Organisational unit conducting the course** | Department of Automatic Control and Robotics | **Date of issuing the programme** |
| **Author of the programme** | Andrzej Karpiuk, Ph.D. | 23.02.2021 |

**L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,**

**S – seminar**