

COURSE DESCRIPTION CARD

| Faculty of Electrical Engineering | | | | | | | | | | |
|--------------------------------------|---|---|----|---|----|----|---|---------------------------------|---|--|
| Field of study | Electrical and Electronics Engineering | | | | | | | Degree level and programme type | bachelor's degree, full time programme | |
| Specialization/ diploma path | - | | | | | | | Study profile | - | |
| Course name | Power Electronics | | | | | | | Course code | IS-FEE-10013W | |
| | | | | | | | | Course type | elective | |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | winter | |
| | 30 | | | | | | | No. of ECTS credits | 3 | |
| Entry requirements | - | | | | | | | | | |
| Course objectives | The acquaint with basic power electronics devices and different types of converters (DC/DC, AC/DC, DC/AC, AC/AC 1- and 3-phases) and its control. The acquire of skills to different types converter operation analyze. | | | | | | | | | |
| Course content | Power semiconductor devices (SCR, BJT, MOSFET, IGBT). Single and three phases controlled rectifiers with different type of load. The rectifier influence on the net, active, reactive and distortion powers. The DC/AC and AC/DC converters - structures and control. The transistors matrix converter controlled by PWM methods. 2- and 4-quadrant DC-DC converters. Vectorial model of 3-phases converter | | | | | | | | | |
| Teaching methods | lecture, specialization workshop. | | | | | | | | | |
| Assessment method | lecture: written exam; specialization workshop: evaluation of reports. | | | | | | | | | |
| Symbol of learning outcome | Learning outcomes | | | | | | | | Reference to the learning outcomes for the field of study | |
| L01 | lists, clasiffies and discusses operation of basic power electronic converters | | | | | | | | | |
| L02 | discusses properties of the power electronic devices | | | | | | | | | |
| L03 | describes present state and developmental trends of the power electronics | | | | | | | | | |
| L04 | analyses and evaluates operation of selected types converter on the base of test results | | | | | | | | | |
| Symbol of learning outcome | Methods of assessing the learning outcomes | | | | | | | | Type of tuition during which the outcome is assessed | |
| L01 | written and oral exam | | | | | | | | L | |

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| LO2 | written and oral exam | L | |
| LO3 | written and oral exam | L | |
| LO4 | written and oral exam | L | |
| Student workload (in hours) | | No. of hours | |
| Calculation | lecture attendance | 30 | |
| | participation in student-teacher sessions related to the lecture | 10 | |
| | preparation for and participation in exams | 35 | |
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| | | TOTAL: | 75 |
| Quantitative indicators | | HOURS | No. of ECTS credits |
| Student workload – activities that require direct teacher participation | | 42 | 1,5 |
| Student workload – practical activities | | 0 | 0 |
| Basic references | 1. Rashid H. M.: Power electronics handbook : devices, circuits, and applications. Academic Press, 2007. 2. Mazda F.: Power electronics handbook. Elsevier, 2003. 3. Erickson R. W., Maksimowic D.: Fundamentals of power electronics. Kulwer Academic, 2001. 4. Rarnes M.: Practical variable speed drives and power electronics. Elsevier, 2003. | | |
| Supplementary references | 1. Bin Wo: Power conversion and control of wind energy system. J. Wiley & Sons, 2011. 2. Benysek G.: Improvement in the quality of delivery of electrical energy using power electronics systems. Springer, 2007. 3. Wilamowski B. M., Irwin J. D.: Power electronics and motor drives – the industrial electronics handbook. Taylor and Francis, 2005. 4. Strzelecki R., Benysek G.: Power electronics in smart electrical energy networks. Springer, 2008 | | |
| Organisational unit conducting the course | Department of Electrotechnics, Power Electronics and Power Engineering | Date of issuing the programme | |
| Author of the programme | Agata Godlewska | 20.01.2020 | |

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