COURSE DESCRIPTION CARD – SPECIMEN

<table>
<tr><td colspan="10">Faculty of Electrical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Electrical and Electronic Engineering</td><td>Degree level and programme type</td><td>Bachelor's degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6">-</td><td>Study profile</td><td>-</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Microprocessor Technique and Microcontrollers</td><td>Course code</td><td>IS-FEE10009S</td></tr>
<tr><td>Course type</td><td>elective</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>summer</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td><td></td><td></td><td></td><td>No. of ECTS credits</td><td>6</td></tr>
<tr><td>Entry requirements</td><td colspan="9">-</td></tr>
<tr><td>Course objectives</td><td colspan="9">Knowledge about the basic problems of the microprocessor technique and microcontrollers.
Skills on programming of microprocessor systems in low-level and high-level languages.</td></tr>
<tr><td>Course content</td><td colspan="9">Lecture:
Binary arithmetic. Basic topics of the microprocessor engineering. Microprocessor system structures and main components: processors, memories, basic peripheral devices, standard buses, additional circuits. Interrupt systems. Methods of input/output device service. Input/output binary and analogue devices. Exemplary microcontroller family: standard structure, instruction list, peripherals, interrupts, extensions.
Laboratory classes:
Practical exercises in programming of basic algorithms and I/O device service in machine- and high-level language.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Lecture: presentations
Laboratory classes: set of exercises</td></tr>
<tr><td>Assessment method</td><td colspan="9">Written exam and reports</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">describes the activity of microprocessor, microcontrollers and whole microprocessor system</td><td colspan="2"></td></tr>
<tr><td>LO2</td><td colspan="7">distinguishes: types of processors, interrupt systems, semiconductor memories, peripheral device service techniques</td><td colspan="2"></td></tr>
<tr><td>LO3</td><td colspan="7">uses suitable programming tools</td><td colspan="2"></td></tr>
<tr><td>LO4</td><td colspan="7">writes software servicing the microcontroller I/O devices</td><td colspan="2"></td></tr>
<tr><td>LO5</td><td colspan="7">writes software implementation of designed algorithm</td><td colspan="2"></td></tr>
<tr><td>LO6</td><td colspan="7"></td><td colspan="2"></td></tr>
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Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	written exam test on lecture content	L
LO2	written exam test on lecture content	L
LO3	evaluating the student's reports	LC
LO4	evaluating the student's reports and written tests	LC
LO5	evaluating the student's reports and written tests	LC
LO6		

Student workload (in hours)		No. of hours
Calculation	lecture attendance	**30**
	individual work on lecture topics	**15**
	preparation for exam	**10**
	participation in laboratory classes	**30**
	preparation for laboratory classes and drawing up reports	**40**
	participation in student-teacher sessions related to the classes	**10**
	preparation for laboratory classes tests	**10**
	exam and lab-classes tests attendance	**5**
	TOTAL:	**150**

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	**75**	**3**
Student workload – practical activities	**82**	**3**

Basic references	*1. William Stallings: Computer Organization and Architecture, ISBN: 9780135160930; 896 p, 2019, Pearson.* *2. Muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi: The AVR Microcontroller and Embedded Systems, ISBN: 0138003319; 781 p, 2011, Pearson/Prentice Hall.* *3. Stuart Ball: Embedded Microprocessor Systems, ISBN: 0750675349; 432 p, 2002, Elsevier Newnes.*
Supplementary references	*1. Lech Grodzki: Presentations for lecture. Updated each semester.* *2. Lech Grodzki: Manuals for laboratory classes. Updated each semester.*

Organisational unit conducting the course	Department of Control Engineering and Robotics	Date of issuing the programme
Author of the programme	Lech Grodzki, PhD Eng	15.02.2021

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