COURSE DESCRIPTION CARD

<table>
<tr><td colspan="10">Faculty of Electrical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Electrical and Electronics Engineering</td><td>Degree level and programme type</td><td>master's degree, full time programme</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">Digital Signal Processors</td><td>Course code</td><td>IS-FEE-20001W</td></tr>
<tr><td>Course type</td><td></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>winter</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">To acquaint students with the knowledge related to Digital Signal Processor (DSP) software development and the implementation of basic methods of digital signal processing. The above knowledge is extended by practical skills gained in the laboratory classes, during which the student performs implementation of the digital signal processing tasks on a selected DSP platform.</td></tr>
<tr><td>Course content</td><td colspan="9">Lecture: Digital Signal Processors characteristics and their use in electronics and telecommunications. Overview of currently produced DSPs. DSP computer architecture. Designing systems using DSPs. Overview of the selected DSP processor.
Overview of the whole process starting from the design of a digital signal processing method to the implementation on a DSP platform. Software development using C and assembler, software development tools, IDE, API, software optimization, real time data exchange and analysis. Programming tips. The use of the processor peripherals and external devices. Real-time performance. Dedicated real-time operating system. DSP implementation of selected signal processing methods.
Laboratory class: Digital Signal Processor software development. DSP implementation of selected signal processing methods. Student projects.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Lecture, laboratory class, problem solving with implementation on DSP system.</td></tr>
<tr><td>Assessment method</td><td colspan="9">Lecture - test;
Laboratory class - evaluation of student's performance in classes 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">Student knows issues of DSPs architecture and peripheral devices, and knows principles of using DSPs to perform basic digital signal processing tasks;</td><td colspan="2"></td></tr>
<tr><td>LO2</td><td colspan="7">Student is familiar with the issues of software development and knows the principles of DSP implementation of selected digital signal processing methods;</td><td colspan="2"></td></tr>
<tr><td>LO3</td><td colspan="7">Student can develop software on a DSP system with the use of C and IDE, API and dedicated real-time operating system;</td><td colspan="2"></td></tr>
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LO4	Student can formulate the algorithm realisation of digital signal processing method and is able to implement it on DSP system.	
LO5		
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	tests	**L**
LO2	tests	**L**
LO3	evaluation of student's performance in classes and reports	**LC**
LO4	evaluation of student's performance in classes and reports	**LC**
LO5		
Student workload (in hours)		**No. of hours**
Calculation	lecture attendance	**30**
	participation in laboratory classes	**30**
	preparation for laboratory classes and preparation for tests	**40**
	work on projects and reports	**45**
	participation in student-teacher sessions	**5**
	TOTAL:	**150**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	**65**	**2**
Student workload – practical activities	**100**	**4**

Basic references	1. Kehtarnavaz N., Real-Time Digital Signal Processing: Based on the TMS320C6000. Newnes, 2005. 2. Welch T. B., Wright C.H.G., Morrow M.G., Real-Time Digital Signal Processing from Matlab to C with the TMS320C6x DSPs, Taylor & Francis, 2012. 3. Dahnoun N., Multicore DSP: from Algorithms to Real-Time Implementation on the TMS320C66x SoC, Hoboken, John Wiley and Sons, 2018. 4. Texas Instruments, TMS320C6000 Programmer's Guide, 2006. 5. Texas Instruments, TMS320C6000 DSP Peripherals Overview, 2007.
Supplementary references	1. Chassaing R., Digital Signal Processing and Applications with the C6713 and C6416 DSK, Willey&Sons, New York, 2005. 2. Dahnoum N., Digital Signal Processing Implementation Using the TMS320C6000 DSP platform. Prentice Hall, 2000. 3. Kuo S M, Lee B. H., Tian W., Real-Time Digital Signal Processing. Implementations and Applications. Willey&Sons, New York, 2006. 4. Oshana R., DSP Software Development Techniques for Embedded and Real-Time Systems: Embedded Technology. Newnes, 2006.

Organisational unit conducting the course	**Department of Photonics, Electronics and Lighting Technology**	**Date of issuing the programme**
Author of the programme	**Dariusz Jańczak, PhD, DSc**	**24.04.2020**

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