Module SYLLABUS

Organizational unit name	The Polytechnic Institute – Department of Computer Science		
Field of study	Computer Science		
Module name	Programming of embedded systems		
Module code	POWER.IP.5	**Erasmus code**	11.3
ECTS	3	**Module type**	Optional
Year of study	3	**Semester**	6
Form of classes	**Hours total**	**Form of assessment**	
Project classes	30	Graded credit	
Coordinator teacher	dr inż. Daniel Król		
Academic teacher	dr inż. Daniel Król		
Language of instruction	English		
Basic courses	No	**Open course / course at he another field of study**	No
Profile of education	Practical profile	**Study level**	First-cycle level

Prerequisites and additional requirements
1. Knowledge of programming in C and C++ languages 2. Basic knowledge of computer systems architectures 3. Basic knowledge of embedded systems

Learning outcomes for module				

No.	Student after module completion has the knowledge/knows how to/is able to Learning outcome code	Learning outcome type	Method of learning outcomes verification	Form of classes
				Project
1.	The student can program peripheral devices of the embedded system	Skills	project	Y
2.	The student can program the interrupt system	Skills	project	Y
3.	The student can implement simple control algorithms in the embedded system	Skills	project	Y
4.	The student is able to implement software for acquisition and processing of measurement data in the embedded system	Skills	project	Y

5.	Student is able to design and implement human-machine communication interface	Skills	project	Y
6.	Student is able to design, implement and test the application in the embedded system	Skills	project	Y
7.	The student can cooperate as part of a project team, as well as plan and coordinate his work.	Social competence	project	Y

Didactic methods

Forms of classes:
Classes take the form of project, in which designed and implemented a simple embedded system.
Teaching methods:
Motivating to systematically perform the next stages of the project, brainstorming, project method.

Rules of assessment

Passing the project. The grades are issued in accordance with the current regulations of studies at the PWSZ in Tarnów.

Module content (brief)

The classes are oriented to the implementation of the next phases of a software project, dedicated to embedded system.

Module content (comprehensive)

1. Requirements analysis, conceptual design
2. Design and implementation of dedicated software for the embedded system.
3. System testing.
4. Preparation of complete technical documentation.

Recommended literature and teaching resources

1. Rob Toulson, Tim Wilmshurst, „Fast and Effective Embedded Systems Design: Applying the ARM mbed", Newnes, 2012.
2. Yifeng Zhu, „Embedded Systems with ARM Cortex-M3 Microcontrollers in Assembly Language and C", (Second Edition), E-Man Press LLC, 2015
3. Datasheet of NXP microcontrollers: www.nxp.com

Connection with area of study	engineering sciences

Student workload (ECTS credits balance)

Student workload form	Obciążenie studenta [godz.]
Participation in project classes	30
Completion of a project	35
Individual consultations and final project presentation	10
Summary student workload	75

Liczba punktów ECTS:

Workload of the direct assistance of the academic teacher	**1.6**

Workload of the practical classes	**3**

Annotation:
1 hour = 45 minutes