STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Microprocessor technology**		Code **1010332521010331118**
Field of study **Information Engineering**	Profile of study (general academic, practical) **general academic**	Year /Semester **1 / 2**
Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **15** Classes: **-** Laboratory: **30** Project/seminars: **-**		No. of credits **3**
Status of the course in the study program (Basic, major, other) **basic**	(university-wide, from another field) **university-wide**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **3 100%** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge from microprocessor technology, electronics and digital circuits. Acquaintance with programming in C and assembler.
2	**Skills**	Skills in programming in C and assembler and ability to compile and link programs.
3	**Social competencies**	Has a competency to work in a team and to solve the problems seen for the first time.

Assumptions and objectives of the course:

To master the theoretical and practical skills connected to design, building and usage of microprocessor systems.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. has a deeper knowledge in the scope of the microprocessor technology - [K_W04]

Skills:

1. is able to gather the knowledge from literature, databases and other sources; is able to integrate obtained information and to interpret it to give the critical assessment; is able to draw conclusions and to justify thoroughly justify own opinion. - [K_U01]

Social competencies:

1. is able to think in creative and entrepreneurial way - [K_K01]

Assessment methods of study outcomes

Written examination, tests written/oral, projects.

Course description

Lecture: Learning new designs of processors and microprocessors ? comparison of RISC and CISC architectures. Survey of operating systems for the ARM architecture computer processors family. Description of microprocessor peripherals and communication interfaces. Examples of mobile, information science and robotics applications: based on ARM processors.

Lab: Introduction to structure of microprocessors based on ARM architecture. Usage of basic programming tools for C and assembler language. Writing computer programs for handling with microprocessor peripherals (I/O ports, D/A converter). Programming the communication interfaces between microprocessor and sensors (I2C, SPI, RS-232). Multithread and network programming (TCP/IP). Interfacing selected robotic sensors (Laser Scanner, Inertial Measurements Unit, RGB-D camera).

Basic bibliography:

1. Bryndza L.: Mikrokontrolery z rdzeniem ARM9 w przykładach, BTC Legionowo 2009r.
2. Robinson A., Cook M.: Raspberry Pi. Najlepsze projekty, Helion Gliwice 2014r.
3. Prat S. Język C. Szkoła programowania, Wydanie V, Helion 2006r.

Additional bibliography:

1. Upton E., Halfacree G.: Raspberry Pi User Guide, John Wiley & Sons Ltd The Atrium Chichester, 2012
2. Nota katalogowa BCM2835
3. Internet

Result of average student's workload

Activity	Time (working hours)
1. Lectures	15
2. Laboratories	30
3. Tutorials	5
4. Preparation to the laboratory	15
5. Raports from laboratories	10
6. Preparation of own projects	15

Student's workload

Source of workload	hours	ECTS
Total workload	90	3
Contact hours	60	2
Practical activities	60	2