

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Microprocessors systems		Code 1010331151010332704
Field of study Control Engineering and Robotics	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 5
Elective path/specialty -	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: 2 Project/seminars: -		No. of credits 5
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 5 100%
Responsible for subject / lecturer: dr inż. Stefan Brock email: Stefan.Brock@put.poznan.pl tel. 48 61 665 2627 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	K_W08: K_W10: K_W12:
2	Skills	K_U01: K_U16: K_U20:
3	Social competencies	K_K01:
Assumptions and objectives of the course: The aim of the course is to learn the theoretical and practical design and operation of microprocessor-based systems. Student at the end of training should be able to design and program systems with micro-controllers.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. K_W15 - [K_W15] 2. K_W12 - [K_W12] 3. K_W13 - [K_W13]		
Skills:		
1. K_U03 - [K_U03] 2. K_U06 - [K_U06] 3. K_U20 - [K_U20]		
Social competencies:		
1. K_K01 - [K_K01]		
Assessment methods of study outcomes		
Lecture: Assessment of the lecture is written exam of based on design case solution. Laboratory: Assessment of laboratory requires doing indicated exercises and giving reports.		
Course description		

The design and operation microprocessors. Basic types of microprocessor systems. Construction of microcomputer system. Elements associated with CPU: memory, address decoders. Principles of programming microprocessors. Sample microcontroller programming environment. Programming microprocessors. Microcontrollers and digital signal processors. MCU Peripherals: timers, counters, PWM circuits, other peripheral devices. Support for I/O devices. Interrupts and DMA system. Digital / analog and analog / digital. Principles of design of microprocessor systems. Coupling microprocessor systems with input elements and actuators. Communication buses used in microprocessor systems - standard SPI, I2C, 1-wire, USB. Debugging methods for microprocessor systems. Laboratory exercises illustrate the issues discussed during the lectures.

Basic bibliography:

1. Lecture materials provided by the teacher in electronic form.
2. Pont Michael J.: Embedded C, Addison-Wesley
3. Ball Stuart R.: Embedded Microprocessor System, Newnes
4. First Steps with Embedded Systems. Byte Craft Limited

Additional bibliography:

1. Ball Stuart R.: Analog Interfacing to Embedded Microprocessor, Newnes
2. Lipovski G. Jack: Introduction to Microcontrollers, Academic Press
3. Pont Michael J.: Programming Embedded Systems, University of Leicester

Result of average student's workload

Activity	Time (working hours)
1. Lectures	30
2. Laboratory exercises.	30
3. Consultations and examination	15
4. Preparation to laboratory exercises and elaboration of reports.	30
5. Preparation to tests and examination.	20

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	2
Practical activities	60	2