



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Embedded systems

Course

Field of study

Mechatronics

Area of study (specialization)

Design and control of mechatronic devices

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

Tutorials

Projects/seminars

15

Other (e.g. online)

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Phd Eng. Dominik RYBARCZYK

Responsible for the course/lecturer:

email: dominik.rybarczyk@put.poznan.pl

tel. 61 665 2187

Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznań

Prerequisites

Knowledge: Knowledge in the field of automation, sensors and drives, 8-bit microprocessor controllers, computer programming.

Skills: Defining digital functions, designing switching circuits, designing electronic circuits.

Social competencies: Understands the need to learn.

Course objective

Learning about the construction, operation and design of electronic circuits based on embedded systems.



Course-related learning outcomes

Knowledge

1. Construction, basics of operation and the most important parameters of single-chip computers
2. Knowledge of C and Python
3. Support for selected types of sensors in embedded systems
4. Designing embedded systems

Skills

1. Analysis of the structure and capabilities of control systems based on microcontrollers and single-system computers
2. Designing embedded systems
3. Programming in C and Python in embedded systems
4. PCB design for embedded systems

Social competences

1. Understanding the requirement of learning by whole life; ability to inspire and organize learning process of other people
2. Aware of the role of electronics in modern economy and its importance for the development of society and the environment
3. Ability to think and act in a creative and enterprising way

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture and project: Implementation of an electronic system with the operating system based on information from the lecture. Scale of estimate: 51-60% - 3,0 (C), 61-70% - 3,5 (C+), 71-80% - 4,0 (B), 81-90% - 4,5 (B+), 91-100% - 5,0 (A).

Programme content

1. Architecture of computer systems
2. Operating systems - basics of service and implementation
3. ROS operating system - basics of operation, communication
4. User interface - construction, communication with a supervisory system
5. Sensors and drives - commissioning and service in embedded systems



Project:

Building electronic system based on the operating system (e.g. ROS) that supports the drives and sensors

Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the board, discussion and analysis of problems.
2. Project: designing embedded systems, problem solving, discussion, team work

Bibliography

Basic

1. Skalski, Ł., Linux. Podstawy i aplikacje dla systemów embedded, Wydawnictwo BTC, 2012.
2. Kuźniar K., Lal L., Rak T., Programowanie w Linuksie. Ćwiczenia, Wydawnictwo Helion, 2012.
3. Paprocki K. „Mikrokontrolery STM32 w praktyce”.
2. Gońka K., „PODSTAWY .NET MICRO FRAMEWORK DLA MIKROKONTROLERÓW STM32 W JĘZYKU C#”.
3. Brzoza-Woch R., Schenk Ch. „Mikrokontrolery AT91SAM7 w praktyce”.

Additional

1. Technical data on internet, datasheets etc.

Breakdown of average student's workload

| | Hours | ECTS |
|---|-------|------|
| Total workload | 50 | 2,0 |
| Classes requiring direct contact with the teacher | 30 | 1,0 |
| Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹ | 20 | 1,0 |

¹ delete or add other activities as appropriate