COURSE DESCRIPTION CARD - SYLLABUS

Course name
Embedded systems [S1EiT1>SW]

Course

Field of study
Electronics and Telecommunications

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Student has basic knowledge of programming, of the basics of computer construction and microprocessors. He should also understand the need to expand his competences and have the ability to obtain information from specified sources.

Course objective

Presentation the theoretical and practical issues related to embedded systems.

Course-related learning outcomes

Knowledge:
1. Student has organized knowledge with theoretical foundations of computer architecture, principles of operation of embedded systems and management of embeded systems resources i.e. processor, memory, storage.
2. Has knowledge of the network communication of embedded systems.

Skills:
Student is able to do critical analysis of embedded system. Student is able to use appropriate

algorithms for management of embedded system resources.

Social competences:
1. Student is aware of the changes that occur with the evolution of embededsystems. Knows the limitations of his own knowledge and understands the need for continuous updating. Is open to the possibility of continuous training.
2. Student shs professional approach to solving problems related to embeded systems.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture:
Knowledge is verified by an test, which has a written. The test consists of 5 open questions, scored depending on their difficulty (1-5points). Passing threshold is 50%. Final issues on the basis of which questions are prepared will be sent to students by e-mail using the university e-mail system.
Tutorials:
Tutorials are evaluated based on a test (written or oral depending on the size of the group). The test consists of four open questions scored depending on their difficulty. Passing threshold is 50%. The issues on the basis of which the questions are developed correspond to the content presented during the exercises.

Programme content

Lectures:
1. Introduction
Computer history and the division of operating systems. Overview of the most important functions of the operating system.
2. Modern operating systems
The idea of open source software, commercial software. The basics of the bash console shell. The most important tools in Linux. Processes, thread. Process and thread management. Memory.
3. Real-time systems
Characteristics of real-time systems: requirements, structure, properties.
4. Communication
Communication in embedded systems.
5. Examples of embedded systems
Routers as network embedded systems.
6. Processors used in embedded systems
Architecture and characteristics of processors in embedded systems.
7.Characteristics of network operating system
8. Virtualization
Virtualization of network nodes and hosts, network virtualization - tools, sample solutions.
9. Network communication.
Remote access, security, tests.
Tutorials:
1. IPv4 and IPv6 addressing.
2. Process scheduling algorithm in embeded systems.
3. Memory management algorithm.
4. Deadlock detection and deadlock avoidance algorithms.

Teaching methods

Lecture: multimedia presentation supplemented with examples and additional explanations on the board. Lectures are conducted in accordance with the principles of traditional lecture, in justified cases taking the form of a conversational lecture.
Tutorials: multimedia presentation, presentation illustrated with examples given on a blackboard

Bibliography

Basic
1. Silberschatz A., Galvin P.B., „Podstawy systemów operacyjnych”, WNT 2006.

2. Bis M., Linux w systemach embedded, BTC 2011.
Additional
1. Wtallings W., Systemy operacyjne : architektura, funkcjonowanie i projektowanie, Helion 2018

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,00
Classes requiring direct contact with the teacher	55	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,00