



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Internet of Things

Course

Field of study

ICT

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

I/2

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Wydział Informatyki i Telekomunikacji

Instytut Sieci Teleinformatycznych

Responsible for the course/lecturer:

Prerequisites

- The student has a basic knowledge of the TCP / IP stack protocols
- The student understands the communication process between network devices
- The student knows the basics of object-oriented programming
- Student knows how to configure IP network nodes in terms of second and third layer protocols
- The student knows how to create applications in any object-oriented programming language
- The student is ready to work in a group

Course objective

The aim of the module is to familiarize students with key hardware and software elements of the Internet of Things. Students will learn the areas of Internet of Things applications and problems related



to human-machine interaction. The module also aims to familiarize students with the methods, techniques and tools used in the design and optimization of the Internet of Things as well as with the basic tools for Big Data analytics.

Course-related learning outcomes

Knowledge

A student knows advanced methods of modeling, designing and optimizing ICT networks that make up the Internet of Things.

A student knows advanced techniques for solving optimization problems in the Internet of Things.

A student has advanced knowledge of the architecture of the Internet of Things devices; configuring Internet of Things devices and in terms of mechanisms for managing a flow of traffic in the Internet of Things.

A student has an extensive vocabulary in English in the field of terminology used in topics related to the Internet of Things and Big Data processing.

Skills

A student is able to educate himself, gaining knowledge necessary to understand and solve problems occurring in the Internet of Things.

A student can work in a group, actively participating in the planning of the course and in the implementation of laboratory classes related to the Internet of Things.

A student can draw conclusions on the basis of the results of experiments conducted during laboratory classes.

A student is able to use libraries available for the Python programming language in processing of large data sets.

Social competences

A student is aware of a progress and the resulting need for continuous training in the field of the Internet of Things.

A student is aware of the responsibility for joint work in teams implementing ICT projects.

A student is aware of the responsibility for the results of his work, which has a direct impact on the safety of people and devices that make up the Internet of Things.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified during an oral and / or written test.



Test issues, on the basis of which questions are developed, are sent to students via e-mail using the university's e-mail system.

An oral and / or written test consists of 3 to 5 questions for which a descriptive answer is expected. Each answer to the question is rated on a scale of 0 to 5 points. Each question is scored equally. Passing threshold: 50% of points.

In the case of the oral test, students draw questions from a set of 30 questions. In the case of a written test, questions are asked by a lecturer.

The skills acquired during the laboratory classes are verified on an ongoing basis. At each laboratory class, the correctness of the exercises is assessed on a scale from 2 to 5. The final grade is the average of the grades obtained from individual laboratory classes. The final grade is the average of the grades obtained from each laboratory session.

Programme content

Intelligence and capabilities of modern machines

Basic concepts of the Internet of Things

Applications of the Internet of Things

Basic functional elements and techniques in the Internet of Things

IoT traffic flow control

Network technologies for the Internet of Things

Introduction to Big Data: data characteristics and data value, data storage, data processing

Cloud and fog processing

The value of data in business, social and environmental applications

Database systems for the Internet of Things

Techniques of Big Data analysis

The use of Python in processing of large data sets.

Internet of Things security

Internet of Things analysis and monitoring

Optimization techniques for network solutions for the Internet of Things

Design of the IoT applications

Teaching methods



Lectures: multimedia presentations, illustrated with examples given on the blackboard.

Laboratory exercises: practical exercises in groups with the use of network devices.

Bibliography

Basic

- Erik Brynjolfsson, The second machine age: work, progress and prosperity in a time of brilliant technologies; W. W. Norton & Company, 2016
- Robert Stackowiak, Big Data and The Internet of Things: Enterprise Information Architecture for A New Age, Apress, 2015
- Peter Waher, Learning Internet of Things Paperback, Packt Publishing, 2015
- Gaston C. Hillar, Internet of Things with Python Paperback, Packt Publishing, 2016

Additional

Cisco Networking Academy courses in the field of IoT

Breakdown of average student's workload

	Hours	ECTS
Total workload	116	4,0
Classes requiring direct contact with the teacher	76	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	40	1,0

¹ delete or add other activities as appropriate