COURSE DESCRIPTION CARD - SYLLABUS

Course name
Wireless Computer Networks [S2Inf1-IP>BSK]

Course

Field of study
Computing

Year/Semester
1/2

Area of study (specialization)
Internet of Things

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
20

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

A student starting this course should have basic knowledge of operating systems and computer networks. He should also have the ability to obtain information from the indicated sources and be ready to handle cooperation within the team. The student should show such features as: honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people.

Course objective

The aim of the course is to present basic knowledge on the construction and operation of wireless computer networks. Provide students with basic knowledge in the field of technical solutions currently used in wireless computer networks, and especially in wireless local networks. Developing students" skills in solving problems encountered by a designer of wireless computer networks. Acquiring the ability to design, use, and configure wireless computer networks.

Course-related learning outcomes

Knowledge:
1. has a structured and theoretically founded general knowledge related to key issues in the field of wirless computer networks
2. has advanced detailed knowledge regarding selected wireless computer networks issues
3. has knowledge about development trends and the most important cutting edge achievements in computer science and other selected and related scientific disciplines
4. knows advanced methods, techniques and tools used to solve complex engineering tasks and conduct research in a selected area of computer science

Skills:
1. can - when formulating and solving engineering tasks - integrate knowledge from different areas of computer science (and if necessary also knowledge from other scientific disciplines) and apply a systemic approach, also taking into account non-technical aspects
2. is able to assess the suitability and the possibility of using new achievements (methods and tools) and new it products
3. can carry out a critical analysis of existing technical solutions and propose their improvements (streamlines)

Social competences:
1. understands that in the field of it the knowledge and skills quickly become obsolete
2. understands the importance of using the latest knowledge in the field of computer science in solving research and practical problems

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Formative assessment:
a) lectures: based on the answers to the questions which test understanding of material presented on the lectures
b) laboratory classes: based on the assessment of the tasks done during classes and as a homework
Summative assessment:
a) the knowledge acquired in the course of the lecture is verified by a written examination conducted in an examination session. The examination consists of 5 open questions. The final grade is determined using the following scale: (90%, 100%] -> 5.0, (80%, 90%] -> 4.5, (70%, 80%] -> 4.0, (60%, 70%] -> 3.5, (50%, 60%] -> 3.0, (0%, 50%] -> 2.0.
b) verification of assumed learning objectives related to laboratories is based on:
- assessment of skills related to the implementation of laboratory exercises and project progress,
- continuous assessment during each class - rewarding the increase in the ability to use the learned skills and methods,
- evaluation of the wireless computer network project carried out throughout the whole semester in class
Getting extra points for activity during classes, especially for:
- proposing to discuss additional aspects of the issue,
- effectiveness of applying the acquired knowledge while solving a given problem,
- ability to work within a team that practically performs a specific task in a laboratory,
- comments related to the improvement of teaching materials.

Programme content

The lecture program covers the following topics:
- Introduction to wireless networks: categories, technologies, standards.
- Physical layer: radio frequency spectrum, spectrum spreading, antennas.
- Wireless LAN 802.11: MAC sublayer functions, CSMA / CA access algorithm, coverage, bandwidth, frequencies, 802.11 frame, services.
- 802.11 wireless local area networks: topologies, bridge connections, VLANs within wireless networks.
- Security of 802.11 wireless local networks: WEP, WPA.
- 802.16 wireless broadband links: physical layer, MAC, frame, classes of service.
- Bluetooth networks (802.15.1).
- Wireless M2M communication and cloud computing systems.

- The future of wireless networks.
As part of the laboratory, a wireless computer network project is carried out by each student or in teams of two. In addition to the project, the following laboratory tasks are carried out:
Configuring a wireless network using an access point.
Configuring a wireless network in ad hoc mode.
Configuring a wireless bridge connection.
Configuring virtual networks within a wireless network.
Wireless network security.
Wireless network monitoring.
Some of the above-mentioned program content is carried out as part of the student"s own work

Teaching methods

Lecture: multimedia presentation, illustrated with examples given on the board.
Laboratories: practical exercises with the use of network devices, discussion, team work, multimedia show, demonstration, design of a wireless computer network

Bibliography

Basic
1. Andrew S. Tanenbaum, Sieci komputerowe, Helion, 2011.
2. John Ross, Sieci standardu Wi-Fi, Wydawnictwo NAKOM, 2004.
Additional
1. W. Stallings, Wireless Communications and Networks, Pearson, Prentice Hall, 2002.
2. Y.-B, Lin, A.-Ch, Wireless and Mobile All-IP Networks, Wiley, 2005.
3. Azzedine Boukerche, Algorithms and Protocols for Wireless, Mobile Ad Hoc Networks, Wiley-IEEE Press, 2008.
4. Charles E. Perkins, Ad Hoc Networking, Addison-Wesley Professional, 2001.
5. M. Singhal, A.D Kshemkalyani, Distributed Computing Principles Algorithms and Concepts, Cambridge University Press, 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	35	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50