



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Wireless Access Networks [S1Teleinf1>BSD]

Course

Field of study

Teleinformatics

Year/Semester

3/5

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

15

Laboratory classes

15

Other

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 the basics of telecommunications, signal theory and probability calculus, as well as digital telecommunications systems. He/She should have the ability to perform calculations using a mathematical apparatus in the field of mathematical analysis and probability calculus, and to obtain information from the indicated sources. He/She should also understand the need to expand his competences. In addition, in the field of social competences, the student must present attitudes such as honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people

Course objective

1. Provide students with basic knowledge in the field of: theoretical foundations of the propagation of electromagnetic waves, radio communication techniques in ICT networks, as well as the architecture and operation of wireless ICT networks. 2. Develop students' skills in solving basic computational and measurement problems related to the propagation of electromagnetic waves in various environments, the analysis of radio links and networks. 3. Shaping students' skills in acquiring knowledge about new systems and standards of radio transmission in ICT networks

Course-related learning outcomes

Knowledge

1. Has knowledge on the impact of the radio environment on the operation of wireless systems and the principles of designing and analyzing wireless ICT networks: fixed and mobile.
2. Has in-depth knowledge of the propagation of electromagnetic waves, radio communication techniques as well as the architecture and operation of standard wireless ICT networks.

Skills

1. Can define the basic parameters and properties of radio signals and wireless telecommunication systems, compare radio environments and methods of transmission in various radio links, as well as design simple wireless networks, optimizing the work of network devices with imposed limitations.
2. Can solve typical tasks in the field of propagation of electromagnetic waves in various environments and the analysis of radio links and networks.

Social competences

1. Can perceive and formulate directions for the development of wireless telecommunications systems, both in terms of basic research and entire systems
2. Understands the impact of own work on the results of the team and the need to comply with the rules of teamwork in solving technical problems and the benefits of exchanging experiences.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

In terms of lectures:

A written exam taken during the last class (or other time discussed with students) consisting of many questions. Each question is scored independently. The final grade is determined based on the total number of points obtained.

In terms of laboratories:

An assessment of the student's preparation for classes may be carried out. It is graded on an academic scale (2-5).

The correct conduct of laboratory tests is verified on the basis of the submitted reports and/or oral/written responses regarding the content of a given laboratory task. Each laboratory research topic is graded on an academic scale (2-5). The final grade of the laboratories is determined as the average of the partial grades obtained, rounded to the nearest grade on the academic scale.

Programme content

The course will provide content regarding wireless access systems. Important phenomena (and their models) occurring in the wireless channel, as well as their impact on the access techniques used, will be presented. Selected contemporary wireless access systems will also be presented.

Course topics

Lectures:

1. Classification of wireless access systems
2. Propagation of signals in radio channels in various radio environments
3. Models of radio channels
4. Basic techniques of the physical layer in radiocommunication systems
5. Multiple-access methods used in radio channels
6. Review of wireless access systems
7. Prospects for the development of wireless access networks for ICT

Laboratories:

1. Modeling of propagation and its impact on wireless access systems
2. Analysis of selected transmission techniques of modern wireless access systems
3. Analysis of the properties of selected modern wireless access systems

Teaching methods

lecture: multimedia presentation, supplemented with up-to-date examples and additional explanations on the blackboard

laboratories: solving problems, carrying out measurements and modeling results, preparing reports

Bibliography

Basic

1. Wesolowski, Krzysztof. Mobile communication systems. John Wiley & Sons, Inc., 2001.

Additional

3. S Tse D., Viswanath P., Fundamentals of Wireless Communication, Cambridge University Press, 2005

4. Rappaport T., Wireless Communications: Principles and Practice, Prentice Hall PTR, 2002

5. E. Dahlman, S. Parkvall, J. Skold "5G NR: The Next Generation Wireless Access Technology"

Academic Press, 2020

Breakdown of average student's workload

	Hours	ECTS
Total workload	56	3,00
Classes requiring direct contact with the teacher	30	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	26	1,00