COURSE DESCRIPTION CARD - SYLLABUS

Course name
Cellular Network [S1Teleinf1>SK]

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 (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

dr hab. inż. Paweł Kryszkiewicz prof. PP
pawel.kryszkiewicz@put.poznan.pl

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 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: mobile radiocommunication networks, in particular cellular networks and their importance in ICT networks. 2. Developing students' skills in solving basic problems related to the analysis of links and cellular networks. 3. Shaping students' skills in acquiring knowledge about new systems and standards of cellular networks, such as elements of teleinformatic networks.

Course-related learning outcomes

Knowledge:
1. Has knowledge of the influence of the radio environment on the operation and capacity of cellular systems and the principles of designing and analyzing teleinformation networks, in particular cellular networks.
2. Has in-depth knowledge of the propagation of electromagnetic waves, radio communication techniques as well as the architecture and operation of cellular teleinformatic networks.

Skills:
1. Can determine the basic parameters and properties of radio signals and cellular systems, compare radio environments, and design elements of cellular networks, optimizing the work of network devices under the imposed limitations.
2. Can solve typical tasks in the field of propagation of electromagnetic waves in various environments and the analysis of cellular 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 subject is intended to provide content regarding mobile networks. The construction requirements and techniques used will be justified by showing the basic propagation phenomena (and their models). An overview of modern cellular systems will also be presented

Course topics

Lectures:
1. Propagation of signals in mobile radio channels
2. Models of mobile radio channels
3. Basic techniques of the physical layer in radiocommunication systems
4. Multiple-access methods used in radio channels
5. The concept of mobile telephony
6. Review of contemporary cellular systems
7. Prospects for the development of cellular networks and their importance in ICT networks

Laboratories:
1. Modeling of propagation and its impact on cellular networks
2. Analysis of selected transmission techniques used in modern cellular networks
3. Analysis of the properties of selected modern mobile networks

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