COURSE DESCRIPTION CARD - SYLLABUS

Course name
Radiocommunication [S1EiT1E>RKOM]

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
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
30

Projects/seminars
0

Number of credit points

4,00

Coordinators

prof. dr hab. inż. Hanna Bogucka
hanna.bogucka@put.poznan.pl

Lecturers

Prerequisites

At the beginning of this course, a student should know the basics of digital communication systems, baseband transmission, digital modulation, signal transmission over a telecommunication channel. Moreover he or she should have detailed knowledge and mathematical foundations analogue and digital telecommunication systems as well as the digital signal processing.

Course objective

The objective of the course is to have knowledge and understanding of the fundamental problems of radio communication in various radio propagation environments and the basics of contemoprary wireless communication systems.

Course-related learning outcomes

Knowledge:
1. A student has detailed knowledge and mathematical foundations in the area of radio propagation in mobile and dispersive wireless channel, knows its impact on the signal reception quality and recognizes neccessary techniques to combat channel distortions
2. A student has basic knowledge of the idea and architectures of the cellular communication systems,

and radio access networks of subsequent generations of the mobile systems
3. A student has basic knowledge concerning the architecture and maintainance of radio communication systems and elements of tele-informtion networks, including wireless networks

Skills:
1. A student is able to solve basic problems in the area of radio propagation, and design suitable techniques for reliable communication over wireless channels in variuos propagation environments
2. A student is able to compare radio communication systems and stantards, and to select advantageous radio transmission technique or wireless standard in the given propagation and users mobility conditions

Social competences:
1. A student is aware of the necessity of professional approach to technical problems and responsibility for his/her proposed technical solutions; A student understands responsibility for the designed radio communication systems and is aware of the potential threats for the society of improper use of these systems and designs
2. A student understands challenges of contemporary radio communications and the need for continuous learning in face of continuously changing technologies; A student is aware of the impact of radio systems and networks on the information society

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
1. Written exam verifying theory and content of the lectures in the form of a test with 5 - 10 open questions will be set at the end of a semester. The answers will be assessed with points (from 0 to 2). The threshold to pass the exam is 50% of the points possible to acquire.
2. The knowledge and skills acquired in the tutorial classes will be verified in the form of written test based on problems to be solved (4 to 6 problems). The answers will be assessed with points (from 0 to 2). The threshold to pass the exam is 50% of the points possible to acquire. Moreover, during the excercises, activity of students and their social comperences will be assessed and rewarded with points to impact final grade.

Programme content

Lectures:
During the auditory lectures, classification of radio communication systems will be presented first, as well as the nature of signal propagation in radio communication channels and their modelling. Moreover, principles of the physical layer techniques in radio communication and multiple access techniques in radio communication networks will be discussed. In the second part of the lectures, the concept of cellular systems, cellular systems design and capacitity-inreasing methods will be presented. In the third part, basics of the successive generation cellular systems architecture, phsical layer and higher OSI layers will be discussed. Finally, perspectives of future wireless communications will be analysed.
Tutorials:
During the tutorial excercises, the example and representative problems will be solved by the teacher and by the students related to radio signal propagation, multipath fading, Doppler effect, power budget calculation in radio communication links, power loss calculation using empirical radio channel modeling, traffic load calculations in cellular systems based on Erlang models, and signal to interference power ratio calculations for various cell configurations.

Course topics

none

Teaching methods

Lectures: multimedia presentation ilustrated by examples presented and problems solved on the blackboard.
Tutorials: Example problems solved on the blackboard and solving other representative problems given by the teacher.

Bibliography

Basic
1. K. Wesołowski, Mobile Communication Systems, John Wiley and Sons, New York 2002
2. T. S. Rappaport, Wireless Communications, Principles and Practice, Prentice Hall PTR, USA 1996
Additional
1. A. Molisch, Wireless Communication Systems, John Wiley and Sons, 2005
2. G. Stueber, Principles of Mobile Communication Systems, Kluwer Academic Publishers, 2003

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	70	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00