COURSE DESCRIPTION CARD - SYLLABUS

Course name
Introduction to telecommunication [N1Eltech1>WdT]

Course

Field of study
Electrical Engineering

Year/Semester
4/7

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
20

Laboratory classes
10

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge in mathematics (including series of trigonometric functions with fixed coefficients - Fourier), basics of computer science, electromagnetic field.

Course objective

Understanding theoretical and practical issues related to the basic techniques of information transmission in wired and wireless telecommunications systems. Introduction to the issue of waves and antennas and radio transmission systems. Acquiring practical skills in measuring and analyzing parameters: antenna systems, transmission lines and examples of analog and digital filters.

Course-related learning outcomes

Knowledge:
He knows the methods of analog and digital modulation.
Has the need to use the processes of sampling, quantization, coding and modulation of signals in the transmission of information.
He knows the description and structure of analog (passive and active) and digital filters.
He knows the types of antennas and their parameters.

Skills:
Can define the concepts of sampling, quantization and coding of signals in data transmission, interpret the frequency spectra of signals, apply knowledge of the basic scope of analog and digital modulation.

Social competences:
Has the ability to work in a team, openness to the use of modern telecommunications techniques.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: assessment of knowledge and skills demonstrated during the combined exam: test and problem 90 minutes.
Laboratory: reports on laboratory exercises.

Programme content

Introduction to information theory, types of telecommunications systems, analogue signal processing (discretization, quantization), spectral representation of signals, analogue modulation techniques, pulse modulation, noise and their significance in data transmission in telecommunications systems, analogue and digital low-pass filters, measurements of selected parameters and antenna characteristics.

Course topics

Lecture:
Analog (amplitudes, frequencies) and digital modulations (amplitudes, frequencies, phases, QAM), digital signals in the time and frequency domain (FFT transform), analog and digital filters (SOI).
Propagation of an electromagnetic wave in free space,
ground, tropospheric and ionospheric waves;
types of antennas, their structure, principle of operation and parameters
Laboratory:
Exercise 1. Analog (AM, FM) and digital (BASK, BPSK, BFSK) modulations.
Exercise 2. Analog active low-pass filter.
Exercise 3. Frequency analysis of selected electrical signals.
Exercise 4. Directional characteristics of selected antennas.

Teaching methods

Lecture: multimedia presentation (including drawings, photos, animations, films) supplemented with in MATLAB
examples in MATLAB.
Laboratory:
Exercise 1. Analog (AM, FM) and digital (BASK, BPSK, BFSK) modulations.
Exercise 2. Analog active low-pass filter.
Exercise 3. Frequency analysis of selected electrical signals.
Exercise 4. Directional characteristics of selected antennas.
performance of reports on exercises performed, assessment of reports by the laboratory leader, discussions on comments, work in teams.

Bibliography

Basic
1. Gotfryd M., Podstawy telekomunikacji. Telekomunikacja analogowa i cyfrowa, Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów 2010.
2. Kowalik R., Pawlicki C.:, Podstawy teletechniki dla elektryków, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006.
3. Read R., Telekomunikacja, WKŁ, Warszawa 2000.
Additional
1. Zieliński T. P, Cyfrowe przetwarzanie sygnałów. Od teorii do zastosowań, WKiŁ, Warszawa 2007.
Szabatin J., Podstawy teorii sygnałów, WKiŁ, Warszawa 2007.

2. Szóstka J., Fale i anteny, WKiŁ, Warszawa 2009.
3. Haykin S., Systemy telekomunikacyjne. Część I, WKiŁ, Warszawa 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	85	3,00
Classes requiring direct contact with the teacher	35	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00