COURSE DESCRIPTION CARD - SYLLABUS

Course name
Introduction to telecommunication [S1Eltech1>WdT]

Course

Field of study
Electrical Engineering

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
compulsory

Number of hours

Lecture
30

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

The student who begins this subject should have basic informations about mathematics, computer science, circuit theory, electromagnetic field, as well as the ability to use a mathematical apparatus in the analysis of simple continuous signals and measurements of basic electrical quantities.

Course objective

Providing students with knowledge related to basic signal processing and information transmission techniques (analogue and digital) in wired and wireless telecommunications systems. Acquisition and development of practical skills of measurement and analysis of antenna and transmission line parameters, as well as signal spectral analysis.

Course-related learning outcomes

Knowledge:
1. has knowledge of signal processing processes (sampling, quantization), modulation and signal encoding in the transmission of information
2. has knowledge of the construction and operation of the most important wired and wireless components of teletransmission systems

3. has knowledge of surface, troposperic and ionospheric radio wave propagation mechanisms

Skills:
1. is able to assess the possibilities of using specific information transmission techniques in the issues used by the electrical engineer
2. knows how to use knowledge from the basic range of analog and digital modulation and signal coding
3. knows how to use the spectrum analyser and interpret the frequency spectrum of the signals, as well as make basic measurements related to the antennas technique

Social competences:
1. Understands that the use of modern telecommunications techniques often leads to an increase in the competitiveness of the products and services offered by companies

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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The knowledge acquired as part of the lecture is verified during the written colloquium at the last lecture. The colloquium consists of open-ended questions depending on the level of difficulty. Passing threshold: 50% of points. Issues for the exam are sent to the year prefect through university e-mail system 2-3 week and discused during the lecutres.

Skills acquired as part of laboratory classes are verified by checking the preparation (knowledge) for laboratory classes,
- rewarding practical knowledge acquired during previous laboratory exercises,
- assessment of knowledge and skills related to the performance of measurements and their development in the form of reports,
- additional tasks (for willing students) requiring the use of acquired knowledge in practice
- final colloquium checking the knowledge of students acquired during the laboratory.

Programme content

Lecture:
Social significance of telecommunications, introduction the theory of information, types of telecommunications systems, analog signal processing (discretization, quantization), spectral representation of signals, basic parameters of transmission channels and data transmission, analog and pulse modulation techniques, spectrum spreading methods, types and properties of linear codes, pulse-code PCM modulation, noise and its importance in data transmission, electrical and optical transmission media (properties, parameters), connection and connectionless mode, commutation of links and packets, multiplication methods (TDM, FDM and WDM), access to extensive telecommunications systems , basic creases in the subject of waves and antennas (TEM wave, types and parameters of antennas, propagation of radio waves in free space, energy balance, propagation of ground, tropospheric and ionospheric waves), examples of wireless transmission systems.
Laboratory:
In turn, the tasks related to:
- the use of a spectrum analyzer and interpretation of obtained results
- analog and digital modulation techniques through practical signal measurements
- measurements of antennas radiation pattern
- the basic operatinal principles of the directional coupler
- selected issues of the digital signal processing (e.g. quantizer, digital filter)
- design and construction of active filters and measurement of their characteristics.

Teaching methods

Lectures - a lecture with a multimedia presentation (including drawings, photos, animations, films) supplemented with examples given on the board, taking into account various aspects of the issues presented, including: economic and social, presenting a new topic preceded by a reminder of related content known to students in other subjects .
Laboratory - detailed review of reports by the laboratory leader and discussions on comments, demonstration of issues discussed in the lecture (such as modulations) on dedicated electronic systems.

Teaching materials (in the form of dedicated exercise instructions) and current notes are available to the student via the moodle e-learning platform.

Bibliography

Basic
1. Gotfryd M.: Podstawy telekomunikacji. Telekomunikacja analogowa i cyfrowa, Oficyna Wyd. Politechniki Rzeszowskiej, Rzeszów 2010.
2. Kowalik R. , Pawlicki C.: Podstawy teletechniki dla elektryków, Oficyna Wyd. Politechniki Warszawskiej, Warszawa 2006.
3. Katulski R. J.: Propagacja fal radiowych w telekomunikacji bezprzewodowej, WKŁ, Warszawa 2009.
4. J. Szóstka: Fale i anteny, WKŁ, Warszawa 2006.
5. Materiały dydaktyczne na platformie e-learningowej moodle.put.poznan.pl
Additional
1. Szabatin J. : Podstawy teorii sygnałów, WKŁ, Warszawa 2007.
2. Zieliński T. P.: Cyfrowe przetwarzanie sygnałów, Od teorii do zastosowań, Wyd. WKŁ, Warszawa 2007.
3. Haykin S.: Systemy telekomunikacyjne. Cz. I, WKŁ, Warszawa 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	50	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00