POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Advanced broadcasting techniques

Course

Field of study	Year/Semester
Electronics and Telecommunications	3/6
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15		
Tutorials	Projects/seminars	
	15	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:	Responsible for the course/lecturer:
dr hab. inż. Maciej Krasicki	

Prerequisites

Essentials of digital communication systems (digital modulations), an ability to develop C++ or Matlab code

Course objective

The course aim is to provide students with the knowledge on selected advanced modulation, detection, coding, and decoding techniques, as well as the methods to evaluate the performance of communication systems.

The students will get familiar with the Monte Carlo simulation of communication systems.

Course-related learning outcomes

Knowledge

A student knows BICM, BICM-ID and iteratively-decoded serial turbo-codes.

Skills

A student can evaluate the performance of a communication system by means of Monte Carlo simulation.

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Social competences

A student understands the need to refer to scientific publications.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: an oral exam on which a student develops solutions to scientific problems basing on publications, considered on the lecture. One of two question is selected randomly by a student, the second is asked by the lecturer.

Project: Presentation of a simulation program code and discussion on the simulation results.

Programme content

Recap on TCM and CPM.

Radio channel propagation issues, BICM and BICM-ID techniques.

Serially-concatenated turbo codes and iterative decoding.

Teaching methods

Lecture based on selected scientific publications.

Regarding the project part, a student judges the performance of a telecommunication system by means of a simulation experiment (Monte Carlo method).

Bibliography

Basic

Zehavi "8PSK trellis codes for a Rayleigh Channel" IEEE Trans. on Commun. Vol. 40, no. 5, May 1992

X.Li, J.A. Ritcey "Bit-interleaved coded modulation with iterative decoding using soft feedback" E. Letters 14th may 1998, vol.34, No. 10

X. Li, J.A. Ritcey "Trellis coded modulation with bit interleaving and iterative decoding" IEEE Journal on Selected Areas of Communication, vol. 17, no. 4, ASpril 1999

Paul Gray ,"Serially concatenated TCM", Doctor and Philosophy Dissertation, Univ. of South Australlia, March 1999

M. Krasicki "Modyfikacja BI-STCM-ID dla zastosowania w systemach bezprzewodowych sieci komputerowych WLAN", KKRRiT Gdańsk 2007

M. Krasicki "Sposób transmisji sygnałów wykorzystujęcy kodowaną modulację z przeplotem bitowym" Patent 2014.

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Additional

G. Ungerboeck "Channel coding with multilevel/phase signals", IEEE Trans. Inf. Theory, vol. IT-28, No. 1, Jan. 1982

B. Rimoldi, "A decomposition approach to CPM", IEEE Trans. Inf. Theory, vol. 34, No. 2, March 1988

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	31	2,0
Student's own work (literature studies, preparation for exam, project preparation) [1]	44	1,0

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[1] delete or add other activities as appropriate