COURSE DESCRIPTION CARD - SYLLABUS

Course name
Digital Signal Processing

Course

Field of study
Electronics and Telecommunications

Year/Semester
I/I

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other (e.g. online)

Tutorials
0

Projects/seminars

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
Prof dr hab. inż. Ryszard Stasiński
ryszard.stasinski@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

Knowledge about basic terms from the mathematical analysis and linear algebra, knowledge about signal processing (analog): basic terms, definition and properties of Fourier and Laplace transforms, Fourier series, design of analog filters.

Course objective

Knowledge and understanding of basic methods of discrete signals analysis, knowledge how to analyse and design digital linear time-invariant systems.

Course-related learning outcomes

Knowledge

1. Knowledge about fundamental tools for analysis of digital signals and systems (z-transform, and Fourier transform)

2. Knowledge about basic tools for practical signal spectrum analysis

3. Knowledge about design and implementation of digital lineartime-invariant filters

Skills

1. Ability to correct interpretation of digital signal or system analysis results

2. Ability to design and implement a linear time-invariant digital filter

3. Ability to do spectrum analysis of a signal

Social competences

1. Understanding necessity and knowledge about continuous learning, improving professional, personal, and social competences

2. Understanding of necessity of professional approach to technical problems, and responsibility for his/her technical solutions

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Exam: Written answers to 8-10 questions covering the subject, passing threshold: 50%.

Laboratory: provision of correct reports from exercises, passing of tests after exercise series

Programme content

Lecture: Signal sampling and quantization. Linear time-invariant systems. Convolution. Z-transform: properties, inverting. Discrete-time Fourier transform, and Discrete Fourier transform. Structures of digital filters. FIR and IIR filter design. Fast Fourier transform, pecularities of its outcome, applications: spectrum analysis of signals, and fast filtration

Laboratory: Signal sampling. Discrete systems: transfer function, stability, impulse response. Discrete Fourier transform and its pecularities. Digital filters: FIR and IIR. Coherent averaging of signals

Teaching methods

Lecture: Multimedia presentaion plus explanation of details on a blackboard.

Laboratory: Short presentation preceding practical exercises based on Matlab programs.

Bibliography

Basic

Digital Signal Processing, J.G. Proakis, D.G. Manolakis, Pearson – Prentice-Hall, ed. 4

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	70	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	55	2,0

[1] delete or add other activities as appropriate