UNIVERSITY OF DEBRECEN
Doctoral School of Informatics

Complex exam minor subject

Theory and Practice of Analog and Digital Communications

Syllabus

The subject deals with

- Fourier Transform (FT); Properties of FT, Continuous- and Discrete Spectra.
- Impulse- and Frequency Response, Characteristics of Linear-Time Invariant (LTI) systems, Signal transmission through LTI systems, Filters, Quadrature Filters, Hilbert Transform.
- Amplitude Modulation (AM); Single- and Double-Sideband Modulation, Ordinary AM, Frequency Translation and Mixing, Frequency-Division Multiplexing.
- Angle Modulation; Instantaneous frequency, Phase- and Frequency Modulation, Fourier Spectra of Angle-Modulated Signals, Narrowband Angle Modulation, Sinusoidal Modulation, Bandwidth of Angle-Modulated Signals, Generation of Angle-Modulated Signals.
- Pulse Code Modulation, Sampling and Sampling Theorem, Pulse Amplitude Modulation, Quantizing, Encoding, Bandwidth Requirements of PCM.
- Delta Modulation, Signaling Format, Time-Division Multiplexing, Bandwidth Requirements for TDM, Pulse Shaping, Digital Modulation Systems.
- Probability, Random Variables and Processes, Additive Noise and Signal-to-Noise Ratio, Noise in Baseband Communication Systems, Noise in Amplitude Modulation System, Noise in Angle Modulation System.
- Binary Signal Detection, Probability of Error, Optimum Detection, Error Probability in Binary Transmission Systems.
- Measure of Information, Discrete Memoryless Channels, Mutual Information, Channel Capacity, Additive White Gaussian Noise, Source Coding, Entropy Coding.
- Channel Coding, Block Codes, Linear Block Codes, Cyclic Codes, Convolutional Codes, Decoding of Convolutional Codes.

Bibliography

1. Hwei P. Hsu, Theory and Problems of Analog and Digital Communications, McGRAW-HILL 2002
2. Jimmie J. Cathey, Electronic Devices and Circuits, McGRAW-HILL 2002.
3. Robert Pease, Analog Circuits, Elsevier Newnes, 2008
4. Edmund Lai, Practical Digital Signal Processing, 2003

Compulsory subjects for this minor subject

Recommended subjects for this minor subject