

EEE.5.3 - Telecommunications

The course "Telecommunications" is a 5th semester obligatory special background course. Its aim is not only to give basic telecommunication postulates understanding, but also to offer a spherical overview of the telecommunications field.

The course is organized in lectures and laboratory exercises as follows:

1. Introduction to the necessity of telecommunications. Basic concepts of Information and Signals. Telecommunication signals. Time and frequency domain properties.
2. Categorization of telecommunication systems based on the electromagnetic transmission channel. Analog and digital telecommunications. System-based view of telecommunications. General block diagram and subsystems.
3. The transmitter. Introduction to encoding and modulation. The concept of carrier signal and frequency shifting (up and down conversion). Introduction to analog telecommunications. Amplitude modulation (AM, DSB, SSB). Theoretical concepts and practical implementations.
4. Angle modulations (FM, PM). Theoretical concepts and practical implementations.
5. Applications. Stereo transmission. Frequency division multiplexing.
6. Amplitude and angle demodulation. Theoretical concepts and practical implementations.
7. The receiver. Homodyne and heterodyne receivers.
8. Introduction to channel impairments. The concept of noise. Noise and figure of merits in analog communications.
9. Link budget. Concept, basic quantities and calculations.
10. Introduction to Pulse modulations (PAM, PPM, PWM).
11. Introduction and overview of wireless communications systems.
12. Introduction and overview of optical communications.
13. Introduction to Sampling, quantization and encoding. Introduction to digital communications.