Degree competences to which the subject contributes

Transversal:

07 AAT N2. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

Learning objectives of the subject

The objective of this subject is to teach the fundamental mechanisms used by data transmission systems, including error control, data compression and cryptography.

Study load

| Total learning time: 150h | Hours large group: 65h 43.33% | Self study: 85h 56.67% |
### 1. Introduction. (6h)

**Description:**
1.1 General scheme  
1.2 The concept of information  
1.3 Source entropy  
1.4 Channel capacity

**Learning time:** 13h 48m  
Theory classes: 6h  
Self study: 7h 48m

### 2. Source coding (6h)

**Description:**
2.1 Objectives and limits of lossless compression  
2.2 Types of codes  
2.3 Kraft's inequality  
2.4 Source coding algorithms

**Learning time:** 13h 48m  
Theory classes: 6h  
Self study: 7h 48m

### 3. Channel coding (20h)

**Description:**
3.1 Introduction  
3.2 Block codes  
3.3 Convolutional codes

**Learning time:** 46h  
Theory classes: 20h  
Self study: 26h
4. Basic cryptography (23 h)  

**Description:**  
4.1 Introduction  
4.2 Security Services  
4.3 Classical Cryptography  
4.4 Modern Secret Key Cryptography  
4.4.1 Stream ciphers  
4.4.2 Block ciphers  
4.5 Modern Public Key Cryptography  
4.5.2 Diffie-Hellman  
4.5.3 RSA  
4.5.4 Digital Signature

**Learning time:** 52h 54m  
Theory classes: 23h  
Self study: 29h 54m

5. Dimensioning of transmission systems (10 h)  

**Description:**  
5.1 Birth-Death Processes in Equilibrium  
5.2 Little's Law  
5.3 Delay Systems (Erlang-C)  
5.4 Loss Systems (Erlang-B)

**Learning time:** 23h  
Theory classes: 10h  
Self study: 13h

Qualification system

The final grade will include continuous assessment (active participation in class and a mid-term exam) and the final exam, according to the following weight:  
Final exam: 60%  
Continuous assessment: 40%
Bibliography

Basic:


Complementary: