230093 - TD - Data Transmission

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 744 - ENTEL - Department of Network Engineering
Academic year: 2017
Degree: BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: Rico Novella, Francisco Jose
Others: Forne Muñoz, Jorge
Rojas Espinosa, Alfonso

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.

Teaching methodology

Lectures
Individual work
Mid-term and final exam

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

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 65h</th>
<th>43.33%</th>
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<tbody>
<tr>
<td></td>
<td>Self study: 85h</td>
<td>56.67%</td>
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Last update: 30-06-2017
## Content

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<tr>
<th>Section</th>
<th>Learning time: 13h 48m</th>
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<td><strong>1. Introduction. (6h)</strong></td>
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<tr>
<td><strong>Description:</strong></td>
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<tr>
<td>1.1 General scheme</td>
<td></td>
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<td>1.2 The concept of information</td>
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<td>1.3 Source entropy</td>
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<tr>
<td>1.4 Channel capacity</td>
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| **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   |                        |

| **3. Channel coding (20h)**   | Learning time: 46h     |
| **Description:**               |                        |
| 3.1 Introduction               |                        |
| 3.2 Block codes                |                        |
| 3.3 Convolutional codes        |                        |
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: