Course guides
230624 - BIOM - Biometrics

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications.

Degree: MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Optional subject).

Academic year: 2020
ECTS Credits: 5.0
Languages: English

LECTURER

Coordinating lecturer: JAVIER HERNANDO

Others: Sayrol Clols, Elisa

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Ability to apply information theory methods, adaptive modulation and channel coding, as well as advanced techniques of digital signal processing to communication and audiovisual systems.

Transversal:
2. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.
3. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

TEACHING METHODOLOGY

- Lectures
- Individual work (distance)
- Oral presentations
- Extended answer tests

LEARNING OBJECTIVES OF THE SUBJECT

In this course principles and methods of biometric systems will be presented to the student. The course will also cover the state-of-the-art techniques in audio, image and video technologies, including Deep Learning

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>39,0</td>
<td>31.20</td>
</tr>
<tr>
<td>Self study</td>
<td>86,0</td>
<td>68.80</td>
</tr>
</tbody>
</table>

Total learning time: 125 h
<table>
<thead>
<tr>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
</tr>
<tr>
<td>- Definitions, examples, applications</td>
</tr>
<tr>
<td><strong>Full-or-part-time:</strong> 4h</td>
</tr>
<tr>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td>Self study : 2h</td>
</tr>
</tbody>
</table>

| 2. System Architecture and Assessment |
| **Description:** |
| - System architecture: features, classifiers |
| - Performance criteria |
| **Full-or-part-time:** 9h |
| Theory classes: 3h |
| Self study : 6h |

| 3. Face recognition |
| **Description:** |
| - Face detection |
| - Face recognition |
| **Full-or-part-time:** 18h |
| Theory classes: 6h |
| Self study : 12h |

| 4. Fingerprint recognition |
| **Description:** |
| **Full-or-part-time:** 9h |
| Theory classes: 3h |
| Self study : 6h |

| 5. Iris recognition |
| **Description:** |
| **Full-or-part-time:** 9h |
| Theory classes: 3h |
| Self study : 6h |
6. Speaker recognition

Description:
- Identification and verification
- Diarization

Full-or-part-time: 18h
Theory classes: 6h
Self study: 12h

7. Other biometrics

Description:
- Signature
- Hand geometry
- Keystroke
- Others

Full-or-part-time: 44h 40m
Theory classes: 8h 40m
Self study: 36h

8. Multimodal biometrics

Description:
- Fusion levels
- Normalization and fusion

Full-or-part-time: 8h
Theory classes: 2h
Self study: 6h

ACTIVITIES

Partial control

Related competencies:
CE1. Ability to apply information theory methods, adaptive modulation and channel coding, as well as advanced techniques of digital signal processing to communication and audiovisual systems.

CTS. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Full-or-part-time: 2h
Theory classes: 2h
Oral presentation of individual work

Related competencies:
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Full-or-part-time: 0h 20m
Theory classes: 0h 20m

Final exam

Description:
Final examination.

Related competencies:
CE1. Ability to apply information theory methods, adaptive modulation and channel coding, as well as advanced techniques of digital signal processing to communication and audiovisual systems.
CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Full-or-part-time: 3h
Theory classes: 3h

GRADING SYSTEM

Partial exam 1: 25%
Partial exam 2: 25%
Assignment and oral presentation: 25%
Practices: 25%
If all the marks are bigger than 3.5 and the weighted average is bigger than 5, passed
Otherwise,
Final exam: 50%
Assignment and oral presentation: 25%
Practices: 25%

BIBLIOGRAPHY

Basic:

Complementary: