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.

Teaching methodology

- Lectures
- Laboratory classes
- Group work (distance)
- Oral presentations
- Short answer test (Control)
- Extended answer test (Final Exam)

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.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 39h</th>
<th>26.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 13h</td>
<td>8.67%</td>
</tr>
<tr>
<td></td>
<td>Self study: 98h</td>
<td>65.33%</td>
</tr>
</tbody>
</table>

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications
Academic year: 2015
Degree: BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: English

Teaching staff

Coordinator: JAVIER HERNANDO
Others: XAVIER GIRÒ

Requirements

PIV, PAV.

Teaching methodology

- Lectures
- Laboratory classes
- Group work (distance)
- Oral presentations
- Short answer test (Control)
- Extended answer test (Final Exam)
# Content

## 1. Introduction

**Learning time:** 6h  
Theory classes: 2h  
Self study: 4h

**Description:**  
- Definitions, examples, applications.

## 2. Pattern Classification

**Learning time:** 18h  
Theory classes: 4h  
Laboratory classes: 2h  
Self study: 12h

**Description:**  
- Definitions, applications, basic concepts.  
- Architecture: features, classifiers.  
- Discriminative, un/supervised algorithms.

## 3. System Architecture and Assessment

**Learning time:** 13h  
Theory classes: 3h  
Laboratory classes: 2h  
Self study: 8h

**Description:**  
- System architecture.  
- Performance criteria.

## 4. Speaker Recognition

**Learning time:** 34h  
Theory classes: 9h  
Laboratory classes: 3h  
Self study: 22h

**Description:**  
- Text dependent and text independent system.  
- Speech features.  
- Speaker models: GMM, HMM, discriminative approaches.
### 5. Main Image Biometrics

**Description:**
- Face recognition.
- Iris recognition.
- Fingerprint recognition.
- Other image-based modalities.

**Learning time:** 51h  
  - Theory classes: 13h  
  - Laboratory classes: 4h  
  - Self study: 34h

### 6. Multimodal Biometrics

**Description:**
- Signal, feature, score and decision levels.  
- Normalization and fusion.

**Learning time:** 16h  
  - Theory classes: 4h  
  - Laboratory classes: 2h  
  - Self study: 10h

### 7. Other Biometrics

**Description:**  
Other biometrics: technologies and applications.

**Learning time:** 12h  
  - Theory classes: 4h  
  - Self study: 8h
### Planning of activities

#### LABORATORY

**Description:** Algorithm implementation and testing.

#### GROUP

**Description:** Bibliographic research.

#### ORAL PRESENTATION

**Description:** Presentation of the group work.

#### SHORT ANSWER TEST (CONTROL)

**Description:** Multiple choice test.

#### EXTENDED ANSWER TEST (FINAL EXAMINATION)

**Description:** Discussion of concepts.

### Qualification system

Final examination: 40%
Partial examinations and controls: 20%
Exercises: 25%
Laboratory assessments: 15%

### Bibliography

**Basic:**

**Complementary:**