Course guide
230624 - BIOM - Biometrics

Last modified: 11/04/2025

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: 2025 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: FRANCISCO JAVIER HERNANDO PERICAS

Others: Primer quadrimestre:
FRANCISCO JAVIER HERNANDO PERICAS - 10

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

Type	Hours	Percentage
Self study	86,0	68.80
Hours large group	39,0	31.20

Total learning time: 125 h

CONTENTS

1. Introduction

Description:
- Definitions, examples, applications

Full-or-part-time: 4h
Theory classes: 2h
Self study : 2h

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:
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Full-or-part-time: 9h
Theory classes: 3h
Self study : 6h

5. Iris recognition

Description:
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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.
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: 2h
Theory classes: 2h

Oral presentation of individual work

Related competencies :
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.

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.

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

If the mark of partial exam is higher than 5, and the average mark of the partial exam, the assignment and the practices is higher than 7, the final exam will not include the partial exam contents and:

Partial exam 1: 25%
Assignment: 25%
Practices: 25%
Final exam: 25%

Otherwise, the final exam will include the partial exam contents and

Assignment: 25%
Practices: 25%
Final exam: 50%

BIBLIOGRAPHY

Basic:
- Wayman, J. [et al.]. Biometric systems: technology, design and performance evaluation. London: Springer, 2005. ISBN 1852335963.

Complementary:
- Bolle, R.M. [et al.]. Guide to biometrics. New York: Springer, 2004. ISBN 0387400893.