Course guide
295625 - 295MB121 - Applications of Digital and Mobile Health

Last modified: 30/01/2026

Unit in charge:	Barcelona East School of Engineering
Teaching unit:	707 - ESAII - Department of Automatic Control.

Degree: MASTER'S DEGREE IN ADVANCED BIOMEDICAL TECHNOLOGIES (Syllabus 2025). (Optional subject).

Academic year: 2025   **ECTS Credits:** 6.0   **Languages:** Spanish

LECTURER

Coordinating lecturer: Daniel Romero Pérez

Others: Abel Torres Cebrián

PRIOR SKILLS

- Basic knowledge of programming and databases
- Fundamentals of Statistics

LEARNING RESULTS

Knowledges:
K8. Demonstrate advanced knowledge of digital and mobile health applications (mHealth).
K7. Infer advanced knowledge of digital biomarkers and artificial intelligence techniques in health technologies.

Skills:
S5. Propose digital biomarkers through advanced analysis of biomedical signals, artificial intelligence techniques and bioinformatics.
S8. Design digital and mobile health applications (mHealth).

Competences:
C6. Integrate the values of sustainability and understand the complexity of systems, with the aim of undertaking or promoting actions that restore and maintain the health of ecosystems and improve justice, thereby generating visions of sustainable futures.

TEACHING METHODOLOGY

The course uses the following methodologies:
- Presentation of theoretical contents.
- Discussion of scientific problems or articles.
- Carrying out individual and cooperative work.
- Sessions in computer or simulation laboratories

LEARNING OBJECTIVES OF THE SUBJECT

- The objective is to introduce the student to the Digital Health and mHealth systems, exploring their impact on the transformation of the health sector. Students will analyze key technologies in mHealth such as wearables, mobile apps, telemedicine and artificial intelligence, and learn how to design and evaluate mHealth applications that are usable, accessible and secure. In addition, they will acquire skills in the analysis of digital health data to improve clinical decision-making and will learn about the regulatory framework and ethical challenges associated with the development and implementation of mHealth solutions.

STUDY LOAD

Type	Hours	Percentage
Self study	108,0	72.00
Hours small group	21,0	14.00
Hours large group	21,0	14.00

Total learning time: 150 h

CONTENTS

Introduction to Digital Health and mHealth

Description:
- Fundamental concepts: eHealth, mHealth, telemedicine.
- Evolution of mHealth, potential and limitations.
- Regulatory and normative framework.

Full-or-part-time: 18h
Theory classes: 2h
Self study : 16h

Key Technologies in mHealth

Description:
- Mobile devices: smartphones, tablets, wearables
- Health mobile applications (Apps).
- Telemedicine and telehealth. Internet of Things (IoT) in healthcare.
- Artificial intelligence for efficient mHealth systems.
- Signal Processing and Machine Learning
- Big data and data analysis as a support for decision-making.

Related activities:
Study of real cases of mHealth applications. Reading and discussion of scientific articles. Development of individual or group projects.

Full-or-part-time: 44h
Theory classes: 10h
Laboratory classes: 2h
Guided activities: 8h
Self study : 24h

Clinical Applications of mHealth

Description:
- Sensors for mHealth systems
- Remote patient monitoring and digital diagnosis: telemedicine, telemonitoring.
- Management of chronic diseases: diabetes, hypertension, respiratory diseases.
- Public health: health campaigns, epidemiological surveillance.

Related activities:
Integration of medical devices (sensors, wearables) with mHealth applications. Development of prototypes for simplified versions of mHealth applications. Development of individual or group projects.

Full-or-part-time: 38h
Theory classes: 8h
Practical classes: 2h
Guided activities: 8h
Self study : 20h

mHealth Application Development

Description:
- Life cycle of health software development.
- Development platforms: iOS, Android.
- User-centered design.
- Mobile app evaluation

Related activities:
Creation of interactive health data visualization panels. Design of intuitive and engaging user interfaces (UI) and user experience (UX). Development of individual or group projects.

Full-or-part-time: 38h
Theory classes: 8h
Practical classes: 2h
Guided activities: 8h
Self study : 20h

Challenges and Opportunities of mHealth

Description:
- Data privacy and security.
- System interoperability.
- Acceptance by users and health professionals.
- Socioeconomic impact of mHealth
- Ethics and legal aspects.

Full-or-part-time: 12h
Theory classes: 2h
Self study : 10h

GRADING SYSTEM

Evaluation of Directed Activities (AD) = 30%
Project Evaluation (NP) = 30%
Finla Examen (EF) = 40%
Total score (Nf): 0.30*AD + 0.30*NP + 0.40*EF

BIBLIOGRAPHY

Basic:
- Istepanian, Robert S. H.; Woodward, Bryan. M-health : fundamentals and applications [on line]. Hoboken, New Jersey: John Wiley & Sons, [2017] [Consultation: 10/09/2025]. Available on: https://onlinelibrary-wiley-com.recursos.biblioteca.upc.edu/doi/book/10.1002/9781119302889. ISBN 9781119302889.
- Ogrodnik, Peter J. Medical device design : innovation from concept to market [on line]. Second edition. London: Academic Press, 2020 [Consultation: 10/09/2025]. Available on: https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9780128149621/medical-device-design. ISBN 9780128149638.
- Moumtzoglou, Anastasius. M-Health innovations for patient-centered care [on line]. Medical Information Science Reference, 2016 [Consultation: 19/09/2025]. Available on: https://www-igi-global-com.recursos.biblioteca.upc.edu/gateway/book/140965. ISBN 9781466698611.

Complementary:
- Topol, Eric. The Patient will see you now : the future of medicine is in your hands [on line]. New York: Basic Books, 2015Available on: https://pmc.ncbi.nlm.nih.gov/articles/PMC4442231/. ISBN 9780465054749.

RESOURCES

Other resources:
Class material available to ATENEA
MATLAB/Python,
Flutter/Figma,
FireBase