Universidad Rey Juan Carlos

TEACHING GUIDE

EXTERNAL PRACTICES 1 (HOSPITALS AND HEALTH)

GRADO EN INGENIERÍA BIOMÉDICA (INGLÉS) (3º y 4º curso) (2374)

ACADEMIC YEAR 2026-27

Q2803011B UNIVERSIDAD REY JUAN CARLOS
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I.-Subject Identification	
Type	OBLIGATORIA
Teaching period	4 course, annual
Nº of credits	9
Language in wich the subject is taught	English

II.-Presentation

Las rotaciones realizadas durante las prácticas en hospitales buscan proporcionar al estudiante del Grado en Ingeniería Biomédica una visión del ámbito hospitalario, desde el punto de vista de la utilidad y utilización de las distintas tecnologías actualmente relacionadas con los ámbitos de conocimiento cubiertos por la formación en los distintos cursos del grado. También posibilitan el desarrollo de las competencias para integrarse en un área hospitalaria, impulsar la identificación de necesidades abordables desde el ámbito multidisciplinar del grado y realizar una descripción de la necesidad y de las posibles soluciones a abordar. Por tanto, las tecnologías que se pueden explorar comprenden tecnologías de la información y comunicaciones; informática y programación; bases de datos; electrónica; análisis de datos, de señales médicas y de imágenes médicas; estándares e interoperabilidad; biomecánica y biomateriales; genómica y proteómica; estadística y optimización; y, en definitiva, todas aquéllas que se identifiquen por parte del alumnado y el profesorado como relacionados con la ingeniería biomédica dentro de cada área médica.

El objetivo, pues, de esta asignatura, es triple:

1. Proporcionar al (a la) estudiante una panorámica de un número suficiente de diferentes áreas hospitalarias. Facilitar a la (al) estudiante el desarrollo de una visión activa y fundamentada sobre las necesidades y uso de las diferentes tecnologías presentes en cada una de dichas áreas.
2. Impulsar la identificación de problemas específicos abordables a través de las competencias desarrolladas en el Grado en Ingeniería Biomédica, y la elaboración de proyectos multidisciplinares orientados a su resolución.
3. Impulsar la identificación de problemas específicos abordables a través de las competencias desarrolladas en el Grado en Ingeniería Biomédica, y la elaboración de proyectos multidisciplinares orientados a su resolución.

III.-Learning outcomes

CG01 . Analyze and synthesize problems related to biomedical engineering, solve them and communicate them efficiently.
CG07. Work in a multidisciplinary group of engineers and biomedical scientists.
CE01 . Understand or acquire the principles of bioelectrical fundamentals, anatomy, physiology or pathophysiology needed to identify the most appropriate processing technologies for a given problem in biomedical engineering
CE21 . Extract biomedical data from its environment, including knowledge of medical consultation systems, and information standards in medical equipment.

- Key for degrees not adapted to RD 822/21: **CB** - basic competences, **CG** - generic competences, **CE** - specific competences, **CT** - transversal competences.
- Key for degrees adapted to RD 822/21: **CON** - knowledge, **COM** - competences, **HAB** - skills.

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IV.-Contents

IV.A.-Syllabus

INTRODUCTION

• Presentation of the course. Relevance, context within the degree program, and scientific framework.

• Selection and presentation of the course project and formation of groups.

BLOCK I.- Global change. General frameworks, models, and dimensions of sustainability

• Topic 1: Global change and challenges for a sustainable world and societies: Major global challenges today. Past and present agendas for addressing these challenges, as well as multilateral frameworks. Dimensions of sustainability: environmental, social (and cultural), economic, etc., and the interrelationship between them. Limits, carrying capacity, and the strong sustainability paradigm.

BLOCK II.- Environmental dimension of sustainability

• Topic 2: The scientific method and the construction of scientific knowledge. Relevance of scientific evidence in society.

• Topic 3: Causes and effects of biodiversity loss. Ecosystem services.

• Topic 4: Climate change.

• Topic 5: Causes and effects of environmental pollution in ecosystems.

• Topic 6: Changes in land use and overexploitation of resources.

• Topic 7: One Health.

BLOCK III.- Social dimension of sustainability and legal framework

• Topic 8: Poverty, exclusion, inequality, and environmental justice: theoretical perspectives and tools for understanding the contemporary world.

• Topic 9: Theories of development and the concepts of social change and cultural diversity.

• Topic 10: The construction of social commitment and strategies for a just transition. Alternative ways of inhabiting the world: social movements and alternatives to dominant development.

• Topic 11: Sustainability and social commitment from a legal perspective.

• Topic 12: International legal framework for sustainability.

• Topic 13: Ethics and Human Rights.

BLOCK IV.- Economic dimension: complexity in sustainability models and framework for economic policy action

• Topic 14: Fundamentals of Economics.

• Topic 15: Schools of economic thought. Planetary boundaries from an economic perspective.

• Topic 16: Decision-making by economic agents in resource management and inequalities.

• Topic 17: Corporate Social Responsibility, ESG, and sustainability in business.

BLOCK V.- Issues related to sustainability and tools for a just eco-social transition from biomedical engineering

• Topic 18: Issues relevant to social and environmental sustainability in the professional life of biomedical engineering. Social and environmental impact on actions and projects. Enabling biomedical technologies for just eco-social transformation. Success stories.

• Presentation of projects.

IV.B.-Training activities

Type	Title
Theoretical sessions	Each of the five blocks will include sessions that are entirely or mostly lectures, with student participation included.
Group work	In groups of four, students will work on a challenge that will be set at the beginning of the course. They will apply the knowledge and skills acquired in each block independently, but with the assistance of all the teachers of the subject. In the last two sessions of the course, the work carried out will be presented orally.

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Oral presentations	The work carried out by groups of students throughout the semester, in response to the challenge set at the beginning of the course, will be presented orally in class during the final sessions of the course.
Other activities	In some classes, part of the session will be devoted to opening a discussion with the whole class or in small groups on the issues previously covered.
Test and/or exams	At the end of the course, there will be a theoretical assessment test with questions from the five sections of the syllabus.

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V.-Student workload	
Theoretical sessions	30
Resolution of exercises, problems, case studies, etc.	26
Practical sessions in experimental, technological and clinical laboratories, fieldwork, etc.	0
Tests and/or exams	4
Academic tutorials	8
Related activities: conferences, seminars, etc.	40
Preparation of theoretical sessions and self-study	15
Preparation of practical tasks, exercises, case studies, projects, etc.	42
Preparation for tests and/or exams	15
Total student workload	180

VI.-Methodology and academic programme

Type	Period	Content
Theoretical sessions	Week 1 to Week 15	Theory lectures are delivered through sessions that combine the explanation of fundamental concepts with practical examples. These sessions provide students with a theoretical foundation and should be complemented by subsequent independent study to consolidate understanding of the course contents.
Resolution of exercises, problems, case studies	Week 1 to Week 15	Sessions focused on solving problems in the classroom, enabling students to apply the theoretical concepts covered in the course.
Practical sessions	Week 4 to Week 15	Sessions guided by the professor in which students carry out practical activities related to the course contents.
Academic tutorials	Week 1 to Week 15	On-site sessions aimed at addressing questions and clarifying doubts raised by one or more students regarding specific course contents or learning activities.

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Tests and/or exams	Week 6 to Week 8	Midterm exam designed to evaluate the knowledge acquired in Topics I and II of the course.
Tests and/or exams	Week 15 to Week 20	Final exam designed to evaluate the acquisition of knowledge and skills related to all the theoretical and practical contents of the course. This exam is held in the official ordinary call exam.
Tests and/or exams	Week 4 to Week 15	Assessment of the skills acquired during the practical sessions.
Group work	Week 4 to Week 15	Students work independently in groups to solve the exercises assigned to them and present their solutions in class during a course session. The exercises are then analyzed and discussed collectively in the classroom.

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VII.-Assessment methods

The general assessment method is continuous as established in the *Regulation for the Assessment of Learning Outcomes* of Rey Juan Carlos University.
All the assessment systems established in the degree report must be employed, except for those that have a minimum weight of 0%, which can be used by professors in the academic years they consider relevant. Each assessment system may be applied through one or more assessment activities, consistent with the system. No assessment activity can exceed individually 60% of the overall grade for the subject.
The sum of non re-evaluable activities cannot exceed 40% of the overall grade for the subject and, in general, should not have an established minimum grade (except for practical activities in which, strictly speaking, the conditions of the ordinary call cannot be reproduced in the extraordinary call).
Those students who do not manage to pass the subject in the ordinary call, or do not attend this first call, may attend the extraordinary call only for failed re-evaluable assessment activities.
The distribution and characteristics of the assessment activities are described below.

VII.A.-Description and weight of the assessment activities

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1 - Ordinary assessment period

The assessment system for the ordinary assessment period is structured as follows:

Assessment System	Assessment Activity	Type	Weight	Minimum mark	Contents
SE 5	Assessment of Problem-Solving Activity 1 (Pr1)	Non-reassessable	10%	-	Topics I and II
SE 5	Assessment of Problem-Solving Activity 2 (Pr2)	Non-reassessable	10%	-	Topic III
SE 5	Laboratory Practices (LP)	Reassessable	10%	LP >= 2/10	Contents related to the laboratory sessions
SE 2	Partial Exam (ExP)	Reassessable	25%	Weighted average of ExP and ExF >= 4/10	Topic I and II
SE 2	Final Exam (ExF)	Reassessable	45%		Topics I, II and III

In order to pass the course, the student's performance must meet all of the following minimum requirements:

- The weighted average of ExP and ExF must be equal to or higher than 4/10, calculated as follows: (ExP × 0.25 / 0.70) + (ExF × 0.45 / 0.70) >= 4.
- The mark obtained in Laboratory Practice (LP) must be equal to or higher than 2/10.

Only when these minimum requirements have been met will the Final Mark (FM) be calculated according to the following formula:

- FM = Pr1 × 0.10 + Pr2 × 0.10 + LP × 0.10 + ExP × 0.25 + ExF × 0.45
- Students who obtain a Final Mark (FM) equal to or higher than 5/10 will be deemed to have acquired the competencies associated with the course and will receive the corresponding final grade (Pass, Good, Excellent, or Honors, as applicable).

Important considerations:

- If the minimum mark of 2/10 is not achieved in LP, or if the weighted average of ExP and ExF is lower than 4/10, the Final Mark (FM) will be the mark corresponding to the assessment activity for which the minimum requirement has not been met. In such cases, the final result for the assessment period will be Fail.
- A student will be recorded as Absent / No-show only if they do not take any of the following assessment activities: ExP, ExF, Pr1, Pr2, and LP. In all other cases, the final mark will be calculated in accordance with the criteria described above.
- The assessment activities Pr1 and Pr2 are not eligible for reassessment in the extraordinary assessment period.

2 - Extraordinary assessment period

The extraordinary assessment period is intended for students who have not met the minimum requirements in the ordinary assessment period in those assessment activities that are eligible for reassessment. Accordingly:

- Students must retake those reassessable assessment activities in which the required minimum mark was not achieved in the ordinary assessment period:
- ExP and ExF (if their weighted average is lower than 4/10),
- and LP (if its mark is lower than 2/10).

In addition:

- If the student has achieved the minimum required marks in ExP, ExF, and LP in the ordinary assessment period, but the Final Mark (FM) is still lower than 5/10, the student must retake ExP and/or ExF according to the following criteria:
- The student must retake any exam failed (mark <5) in the ordinary assessment period, namely ExP and/or ExF.
- If both exams were passed, the student must retake the exam with the lowest score.
- LP can also be reassessed if FM<5, however, students should take into account the low relative weight of this component in the calculation of the Final Mark (FM).

3 - Early assessment period

The assessment activities and grading criteria applicable to the early assessment period are the same as those established for the ordinary and extraordinary assessment periods.

Academic integrity and conduct

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- All exams must be completed individually and without any external assistance, except for materials or resources expressly authorized by the professors. Failure to comply with these rules will result in a failing grade in the corresponding assessment period, as well as to take pertinent actions established in the University regulations.
- If professors consider it appropriate, they may require any student to undertake an oral defense of any assessment activity or submitted work. The outcome of this oral defense may lead to the confirmation of the original mark or the assignment of a different mark. Failure to attend this oral defense when required will result in a failing grade (grade = 1) for the assessment activity concerned.

VII.B. Assessment of students with academic exemption from class attendance

Having Academic Exemption from Class Attendance (DAAC) does not imply that students are automatically exempt from participating in the continuous assessment activities or in the training activities of compulsory attendance as established in the teaching guide. Once the exemption has been granted, students must contact the subject's teaching staff, who will propose the adaptations he/she may consider relevant, as long as they guarantee the acquisition and adequate assessment of the learning goals established. Students must maintain adequate communication with the teaching staff so that they may provide information on the dates for training and assessment activities, if these are not established in the programme and available for students at the time of achieving the exemption.
Subject with possibility of academic exemption: Yes.

VII.C. Review of assessment activities

In accordance with the Regulation for the Assessment of Learning Outcomes of Rey Juan Carlos University.

VII.D.-Students with a disability or special educational needs

In order to guarantee equal opportunities, non-discrimination, universal accessibility and academic success, students with disabilities or especial education needs may request curricular adaptations to follow their studies. These adaptations will be provided by the Unit of Attention to People with Disabilities of Rey Juan Carlos University, in accordance with the regulation which regulates the service for the Attention of People with Disabilities at the University. This Unit will issue a report for curricular adaptations, so that students with disabilities or special education needs must contact the service (at e-mail discapacidad.programa@urjc.es) in order to provide relevant information for different educational alternatives.

VII.E.-Academic behaviour, academic integrity and honesty

Rey Juan Carlos University is fully committed to the highest standards of academic integrity and honesty, so studying at the URJC means assuming and subscribing to the values of integrity and academic honesty set out in the University's Ethical Code. To support this process, the University has Rey Juan Carlos University's Academic Conduct Regulation as well as different tools (anti-plagiarism, supervision...) that offer a collective guarantee for the full development of these essential values.

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VIII.-Teaching resources and materials
Basic bibliography
Oppenheim, A. V., Willsky, A. S., & Nawab, S. H. (1997). *Signals & systems*. Pearson Education.
Oppenheim, A. V., & Schafer, R. W. (2009). Discrete-time signal processing (3rd ed.). Pearson Education.
Consultation bibliography

IX.-Professors	
Name and surname	DAFNE LOZANO PAREDES
E-mail address	dafne.lozanop@urjc.es
Department	Teoría de la Señal y Comunicaciones y Sistemas Telemáticos y Computación
Campus	Fuenlabrada
Category	Investigador
Person responsible for the subject	No
Tutorial timetable	Para consultar las tutorias póngase en contacto con el/la profesor/a a través de correo electrónico
Number of quinquennia	0
Number of sexennia	0
No. of positive evaluations by Docentia	0
Name and surname	ENRIQUE FEITO CASARES
E-mail address	enrique.feito@urjc.es
Department	Teoría de la Señal y Comunicaciones y Sistemas Telemáticos y Computación
Campus	Fuenlabrada
Category	Investigador
Person responsible for the subject	No
Tutorial timetable	Para consultar las tutorias póngase en contacto con el/la profesor/a a través de correo electrónico
Number of quinquennia	0
Number of sexennia	0
No. of positive evaluations by Docentia	0

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Name and surname	SARA GARCÍA DE VILLA
E-mail address	sara.garcia.devilla@urjc.es
Department	Teoría de la Señal y Comunicaciones y Sistemas Telemáticos y Computación
Campus	Fuenlabrada
Category	Profesor/a Ayudante Doctor/a
Academic degree	Doctor
Person responsible for the subject	No
Tutorial timetable	Para consultar las tutorias póngase en contacto con el/la profesor/a a través de correo electrónico
Number of quinquennia	0
Number of sexennia	1
No. of positive evaluations by Docentia	1

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