Universidad Rey Juan Carlos

TEACHING GUIDE

Optimization

GRADO EN INGENIERÍA BIOMÉDICA (INGLÉS) (1º y 2º curso) (2384)

ACADEMIC YEAR 2026-27

Q2803011B UNIVERSIDAD REY JUAN CARLOS
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I.-Subject Identification	
Type	OBLIGATORIA
Teaching period	2 course, 1Q semester
Nº of credits	3
Language in wich the subject is taught	English

II.-Presentation

The aim of this course is for students to learn concepts about the databases. In order to achieve this, students begin with the basic knowledge about the databases and their characteristics, to continue with the Entity/Relationship Model for the initial modeling and design, the Relational Model and the theory of Normalization. Finally, both SQL databases and NoSQL databases will be dealt with. The theoretical concepts will be consolidated through practical exercises

III.-Learning outcomes

COM03. Use and design systems for the analysis of large biomedical datasets, from extraction to visualization.
HAB11. Use programming fundamentals for the development of software pro-grams in modern programming languages, as well as understand and use various operating systems, databases, and hospital information systems. Apply these skills in networks, systems, and telematic services for hospital management.

- 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

1.- Introduction to Databases
2.- Entity-Relationship model
3.- Relational model
4.- Query languages, SQL
5.- Installation of a Database Management System
6.- NO-SQL Databases
7.- Database Systems for Healthcare Management.

IV.B.-Training activities

Type	Title
Theoretical sessions	Theoretical sessions
Resolution of exercises, problems, case studies	Practical exercises
Academic tutorials	Mid-term and final exams
Academic tutorials	Tutoring sessions
Practical sessions	Practical deliverables

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V.-Student workload	
Theoretical sessions	14
Resolution of exercises, problems, case studies, etc.	0
Practical sessions in experimental, technological and clinical laboratories, fieldwork, etc.	13
Tests and/or exams	3
Academic tutorials	22
Related activities: conferences, seminars, etc.	2
Preparation of theoretical sessions and self-study	15
Preparation of practical tasks, exercises, case studies, projects, etc.	15
Preparation for tests and/or exams	6
Total student workload	90

VI.-Methodology and academic programme

Type	Period	Content
Tests and/or exams	Week 15 to Week 15	Final exam on theoretical and practical concepts
Tests and/or exams	Week 6 to Week 6	Practice 1
Tests and/or exams	Week 13 to Week 13	Practice 2
Theoretical sessions	Week 1 to Week 15	Theoretical sessions (Chapters 1 to 6)
Practical sessions	Week 1 to Week 15	Practical exercises (Chapters 1 to 6)
Academic tutorials	Week 1 to Week 1	Tutoring sessions

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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

Ordinary evaluation:

1. Practical exercise I: 20% (Chapters 1-3) / Minimum score: 4
2. Practical exercise II: 20% (Chapters 4-5) / Minimum score: 4
3. Theory exam: 20% / Minimum score: 2
4. Practical exam: 40% / Minimum score: 3

Each of the above items will be scored from 0 to 10. To pass the course you must get a weighted average of 5 and achieve at least the minimum required grade in those evaluation components that require it.

Extraordinary evaluation:

1. A theory exam (20%) (Minimum score: 2) and a practical exam (40%) (Minimum score: 3).
2. Delivery of practical exercises I and II (20% and 20%) / Minimum score: 4

Advanced call:

1. A theory exam (40%) (Minimum score: 2) and a practical exam (60%) (Minimum score: 3).

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.

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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
Título: Sistemas de Bases de Datos, Addison Wesley (2005) Autor: CONNOLLY, T.M
Título: Fundamentos de Diseño de Bases de Datos, McGraw-Hill (2007) Autor: SILBERSCHATZ A
Consultation bibliography

IX.-Professors	
Name and surname	DAVID ROLDÁN ÁLVAREZ
E-mail address	david.roldan@urjc.es
Department	Teoría de la Señal y Comunicaciones y Sistemas Telemáticos y Computación
Campus	Fuenlabrada
Category	Titular de Universidad
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	1
Number of sexennia	2
No. of positive evaluations by Docentia	2
Name and surname	ISMAEL GÓMEZ TALAL
E-mail address	ismael.gomez.talal@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

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Number of sexennia	0
No. of positive evaluations by Docentia	0

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