

**1. General information****Course:** CLINICAL BIOANALYTICS**Type:** ELECTIVE**Degree:** 341 - UNDERGRADUATE DEGREE PROGRAMME IN BIOCHEMISTRY**Center:** 501 - FACULTY OF ENVIRONMENTAL SCIENCES AND BIOCHEMISTRY**Year:** 4**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 13333**ECTS credits:** 4.5**Academic year:** 2023-24**Group(s):** 40**Duration:** First semester**Second language:****English Friendly:** Y**Bilingual:** N**Lecturer:** ANA ISABEL CORPS RICARDO - Group(s): 40

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**Lecturer:** FRANCISCO JAVIER GUZMAN BERNARDO - Group(s): 40

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**Lecturer:** ARMANDO SÁNCHEZ CACHERO - Group(s): 40

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**2. Pre-Requisites**

Not established

**3. Justification in the curriculum, relation to other subjects and to the profession**

This subject covers advanced analytical aspects of particular interest in the field of clinical biochemistry. Contents of other subjects, especially "Methodology and Instrumentation in Biochemistry" and "Clinical Biochemistry" are extended in relation to data treatment and advanced instrumental techniques. New concepts and devices, such as (bio)sensors, automatization, and miniaturization are introduced.

**4. Degree competences achieved in this course****Course competences**

Code	Description
E01	Express themselves correctly in basic biological, physical, chemical, mathematical and computer terms.
E13	Correct handling of different computer tools
G03	Be able to collect and interpret relevant data, information and results, draw conclusions and issue reasoned reports on relevant social, scientific or ethical issues in connection with advances in Biochemistry and Molecular Biology.
G06	Acquire skills in the handling of computer programs including access to bibliographic, structural or any other type of databases useful in Biochemistry and Molecular Biology.
T01	Proficiency in a second foreign language, preferably English, at level B1 of the Common European Framework of Reference for Languages
T08	Ability to work as a team and, where appropriate, exercise leadership functions, encouraging entrepreneurship

**5. Objectives or Learning Outcomes****Course learning outcomes****Description**

The professional profile "molecular biomedicine" includes the application of biochemistry in the health sector, so that the student receives a strong biomedical and clinical orientation and also acquires the skills to carry out a professional activity in the field of teaching and research.

**Additional outcomes**

The student will be able to design an analytical strategy for non-routinely clinical determinations.

The student will identify automatic and automatized systems of measurement and assess their pros and cons.

The student will apply experimental design techniques and multi-variate statistical analysis to interpret clinical problems.

The student will discriminate the adequacy of bioanalytical techniques according to the clinical problem to be faced.

**6. Units / Contents****Unit 1: Chemometrics****Unit 2: Advanced Analytical Techniques****Unit 3: Sensors and Biosensors****Unit 4: Automatization in laboratories of clinical analysis**

## Unit 5: Laboratory practice

7. Activities, Units/Modules and Methodology							
Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	E01 E13 G03 T01	1.12	28	N	-	
Study and Exam Preparation [OFF-SITE]	Self-study	E01 E13 G03 T01	2.4	60	N	-	
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	E13 G03 T08	0.48	12	Y	Y	This activity is compulsory and not recoverable.
Progress test [ON-SITE]	Assessment tests	E01 E13	0.04	1	Y	N	
Final test [ON-SITE]	Assessment tests	E01 E13	0.04	1	Y	Y	
Writing of reports or projects [OFF-SITE]	Group Work	E13 G03 T08	0.08	2	Y	Y	
Analysis of articles and reviews [OFF-SITE]	Self-study	G06 T01	0.22	5.5	N	-	
Group tutoring sessions [ON-SITE]	Group Work	G03 T01	0.04	1	N	-	
Final test [ON-SITE]	Assessment tests	E01 E13	0.08	2	Y	Y	
<b>Total:</b>			<b>4.5</b>	<b>112.5</b>			
<b>Total credits of in-class work: 1.8</b>			<b>Total class time hours: 45</b>				
<b>Total credits of out of class work: 2.7</b>			<b>Total hours of out of class work: 67.5</b>				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System			
Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Laboratory sessions	10.00%	10.00%	Result sheets and reports about lab sessions in due time. Only for students who attended lab sessions.
Final test	60.00%	70.00%	Written exam. Questions about theory and numerical problems.
Progress Tests	10.00%	0.00%	Multiple choice test.
Test	20.00%	20.00%	Written exam about lab sessions. Multiple choice test and problems. Only for students who attended lab sessions. A 4/10 is required to include this part in the final grade.
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

### Evaluation criteria for the final exam:

#### Continuous assessment:

The default assessment mode is continuous. Any student may request the change to the non-continuous mode (before the end of the class period) by email to the teacher, provided that they have not completed 50% of the evaluable activities.

The final grade will be the weighted average of all assessable activities. The student will pass the exam if the following occurs:

- 1) Final grade is 5/10 or higher and
- 2) Lab session's grade is 4/10 or higher.

The student will not pass if they have missed one single lab session without justification.

#### Non-continuous evaluation:

The final grade will be the weighted average of all assessable activities. The student will pass the exam if the following occurs:

- 1) Final grade is 5/10 or higher and
- 2) Lab session's grade is 4/10 or higher.

The student will not pass if they have missed one single lab session without justification.

### Specifications for the resit/retake exam:

The final grade will be the weighted average of all assessable activities. The student will pass the exam if the following occurs:

- 1) Final grade is 5/10 or higher and
- 2) Lab session's grade is 4/10 or higher. Otherwise, the student will take a new test.

The student will not pass if they have missed one single lab session without justification.

Laboratory sessions sessions will be assessed again in this resit exam.

### Specifications for the second resit / retake exam:

The student will take a written exam (100 % grade). The student will only sit this exam if they have had attended all lab sessions. The overall grade will be that of the written exam.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours

10. Bibliography and Sources	
Publishing	

Author(s)	Title/Link	house	Citv	ISBN	Year	Description
	Electroforesis capilar : aproximación según la técnica de de	Universidad de Granada		84-338-3649-8	2005	
Cela, R.	Técnicas de separación en química analítica	Síntesis		84-9756-028-0	2002	
Cruces Blanco, Carmen	Electroforesis capilar	Universidad, Servicio de Publicaciones		84-8240-109-2	1998	
Eggins, Brian R.	Chemical sensors and biosensors	John Wiley & Sons		0-471-89914-3	2007	
Miller, James N.	Estadística y quimiometría para química analítica	Pearson Educación		978-84-205-3514-2	2008	
Ramis Ramos, Guillermo	Quimiometría	Síntesis		84-7738-904-7	2001	
Ríos Castro, Angel y otros	Técnicas espectroscópicas en Química Analítica (vol II)	Síntesis		978-84-995893-1-2	2012	
Valcárcel, Miguel y Cárdenas, M. Soledad	Automatización y miniaturización en Química Analítica	Springer Verlag		84-07-00510-4	2000	
	Electrochemical sensors, biosensors, and their biomedical ap	Academic Press		978-0-12-373738-0	2008	