



## 1. General information

Course: FOUNDATIONS OF CHEMISTRY

Type: BASIC

Degree: 341 - UNDERGRADUATE DEGREE PROGRAMME IN BIOCHEMISTRY

Center: 501 - FACULTY OF ENVIRONMENTAL SCIENCES AND BIOCHEMISTRY

Year: 1

Main language: Spanish

Use of additional  
languages:

Web site:

Code: 13306

ECTS credits: 6

Academic year: 2023-24

Group(s): 40

Duration: C2

Second language:

English Friendly: Y

Bilingual: N

Lecturer: MIRIAM BARREJÓN ARAQUE - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
INAMOL/1.4			Miriam.Barrejon@uclm.es	
Lecturer: RUBEN CABALLERO BRICEÑO - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
Edificio 21/INAMOL despacho 1.03	QUÍMICA INORG., ORG., Y BIOQ.	926051833	Ruben.Caballero@uclm.es	Appointment by email
Lecturer: ANA ISABEL CORPS RICARDO - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
ICAM/0.22	Q. ANALÍTICA Y TGIA. ALIMENTOS		Analsabel.Corps@uclm.es	Mondays, Tuesdays, and Wednesdays 10.30 to 12.30 upon appointment by email.
Lecturer: ROCÍO DOMÍNGUEZ MARTÍN - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
Edificio 21/INAMOL Despacho 1.03	QUÍMICA INORG., ORG., Y BIOQ.	926051820	Rocio.Dominguez@uclm.es	Tuesdays and Thursdays from 10 a.m. to 1 p.m. upon appointment by email.
Lecturer: FRANCISCO JAVIER GUZMAN BERNARDO - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
ICAM/0.28	Q. ANALÍTICA Y TGIA. ALIMENTOS	5778	fcojavier.guzman@uclm.es	Mondays, Tuesdays, and Wednesdays 9 to 11 upon appointment by email.
Lecturer: NURIA RODRIGUEZ FARIÑAS - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
Sabatini/0.9	Q. ANALÍTICA Y TGIA. ALIMENTOS	5459	nuria.rodriguez@uclm.es	
Lecturer: ROSA DEL CARMEN RODRIGUEZ MARTIN-DOIMEADIOS - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
Sabatini/0.16	Q. ANALÍTICA Y TGIA. ALIMENTOS	5420	rosacarmen.rodriguez@uclm.es	Mondays, Tuesdays, and Wednesdays 1 to 2 and from 3 to 4 upon appointment by email.

## 2. Pre-Requisites

It is recommended to have basic knowledge on Chemistry from High School and on "Bonding and Structure" from the first semester. A sound base on Maths and Physics is welcome.

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

Foundations of Chemistry is the second matter of General Chemistry in the Biochemistry Grade. The contents are chemical equilibria in solution, introduction to the (bio)chemical analysis and introduction to Organic Chemistry. The student will have this basic matter together with "Bonding and Structure" and "Thermodynamics and Kinetics" to gain a proper understanding of the chemical and biochemical aspects of the biological systems.

This course provides the biochemist with knowledge, skills and expertise in Chemistry for their professional development.

## 4. Degree competences achieved in this course

## Course competences

Code	Description
E01	Express themselves correctly in basic biological, physical, chemical, mathematical and computer terms.
E02	Work properly and quality driven in a chemical, biological and biochemical laboratory, including safety, handling and disposal of waste and keeping a record of activities.
E19	Understand the principles that determine the three-dimensional structure of biological molecules, macromolecules and supramolecular complexes and be able to explain the relationships between structure and function.
G05	Develop those strategies and learning skills necessary to undertake further studies in the area of Biochemistry and Molecular Biology and other related areas with a high degree of autonomy.

T03	A correct oral and written communication
T10	Ability to self-learn and to obtain and manage bibliographic information, including Internet resources

## 5. Objectives or Learning Outcomes

### Course learning outcomes

Description

To know and understand the main types of chemical balance and their implications in biochemical processes.

Acquire the necessary experimental skills for the correct handling of laboratory material and chemical reagents in accordance with safety and waste disposal regulations.

To be able to correctly describe the main regulatory solutions of biological importance and most frequently used in biochemistry laboratories.

### Additional outcomes

To understand and apply the stereochemical and conformational aspects of the organic compounds and of their tri-dimensional models. To be aware of how important these are in the biochemical processes.

To describe the basic mechanisms of the organic reactions.

To apply IUPAC's basic rules for low and medium difficulty organic compounds.

## 6. Units / Contents

### Unit 1: Equilibria

**Unit 1.1** Chemical equilibrium

**Unit 1.2** Acid-base equilibrium

**Unit 1.3** Solubility equilibrium

**Unit 1.4** Complexation equilibrium

**Unit 1.5** Redox equilibrium

### Unit 2: Organic Chemistry

**Unit 2.1** Structure of organic compounds

**Unit 2.2** Isomers in organic molecules

**Unit 2.3** Reactions in Organic Chemistry

### Unit 3: Laboratory practice

**Unit 3.1** Making buffer solutions and studying their properties

**Unit 3.2** Determination of oxygen peroxide by a redox titration

**Unit 3.3** Extraction and separation of substances

**Unit 3.4** Purification techniques: recrystallization and distillation

## 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	G05	1.04	26	N	-	Each lesson starts with a theory lesson. The presentations shown in class will be available at Moodle. The presentations include the aims and contents of each lesson. The classes will be interactive with the participation of the students, discussing the key points of the topics.
Study and Exam Preparation [OFF-SITE]	Self-study	E01 G05 T10	1.56	39	N	-	
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	E01 G05	0.32	8	N	-	
Study and Exam Preparation [OFF-SITE]	Self-study	E01 G05 T10	0.48	12	N	-	
Progress test [ON-SITE]	Assessment tests	E01	0.12	3	Y	N	The student takes a test type form and/or gives exercises proposed by the teacher. This activity is not recoverable.
Study and Exam Preparation [OFF-SITE]	Self-study	E01 G05 T10	0.18	4.5	N	-	
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	E01 E02	0.72	18	Y	Y	Supervised experimental labwork for the students to apply theory. Moreover, the students acquire skills for the handling of labware and chemicals according to the guidelines of security and waste management. The attendance to the lab sessions is compulsory and not recoverable. The assessment of these sessions is recoverable, in either the extraordinary or the special final calls.
Practicum and practical activities report writing or preparation [OFF-SITE]		E01 E19 G05	0.88	22	Y	Y	Presentation of the results of the lab sessions in due time and format. Recoverable by giving the results in

[SITE]							the extraordinary call.
Other on-site activities [ON-SITE]	Assessment tests	E01	0.08	2	Y	Y	Written exam about the lab sessions. Recoverable in the extraordinary call.
Study and Exam Preparation [OFF-SITE]	Self-study	E01 G05 T10	0.12	3	N	-	
Final test [ON-SITE]	Assessment tests	E01 E19 G05	0.12	3	Y	Y	Written exam. Recoverable in the extraordinary call and in the special final call.
Study and Exam Preparation [OFF-SITE]	Self-study	E01 G05 T10	0.38	9.5	N	-	
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

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
Test	10.00%	10.00%	Lab sessions will be evaluated as follows: 1) written exam (5 %) 2) Result sheet (5 %) A minimum grade of 4/10 in lab sessions is required to pass the subject. Only for students who have attended lab sessions.
Progress Tests	10.00%	0.00%	Test type exams.
Final test	40.00%	45.00%	Final test of theory and practice. To make this test countable in the final grade, it is required to get 4/10 in each part.
Final test	40.00%	45.00%	Final test of practice (problems). To make this test countable in the final grade, it is required to get 4/10 in each part.
<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 overall grade will be the weighted average of the scores of the tests. A minimum grade of 5/10 is required to pass. However, the student will not pass if their qualification in the laboratory test is below 4/10 or if they have missed one practice session without justification. The students who passed the practical part in the precedent two years are entitled not to attend lab sessions and keep their grade.

##### Non-continuous evaluation:

The overall grade will be the weighted average of the scores of the tests. A minimum grade of 5/10 is required to pass. However, the student will not pass if their qualification in the laboratory test is below 4/10 or if they have missed one practice session without justification. The students who passed the practical part in the precedent two years are entitled not to attend lab sessions and keep their grade.

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

The overall grade will be the weighted average of the scores of the tests. However, the student will not pass if their qualification in the laboratory test or in the final test is below 4/10 or if they have missed one practice session without justification.

The laboratory grade will be kept if it was over 5. Otherwise, the student will take a separate exam about laboratory sessions.

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

The student will take a written exam. The student will only be able to pass if they have attended the 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						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Vicente Soler Martínez, M. <sup>a</sup> Eugenia González Rosende	QUÍMICA ORGÁNICA PARA CIENCIAS DE LA SALUD	Síntesis		978-84-975657-8-3	2008	
Vinagre Jara, F.	Fundamentos y problemas de química	Alianza Editorial		84-206-8130-X	1996	
García Calvo-Flores, Francisco	Problemas resueltos de química orgánica	Thomson		978-84-9732-458-8	2008	
García Pérez, J. A.	Formulación y nomenclatura de química inorgánica : Normas I.	Tebar Flores		84-7360-132-7	1993	
López-Cancio	Problemas de química. Cuestiones y ejercicios	Prentice-Hall			2001	

M. <sup>a</sup> Josefa Rodríguez Yunta, Lucrecia Campayo Pérez, M. <sup>a</sup> del Carmen Cano Benjumea y Ana M. <sup>a</sup> Sanz	Problemas de química para estudiantes de biología	Síntesis	9788499588681	2013
McMurry, John	Organic chemistry	Thomson/Brooks/Cole	0-534-42005-2	2004
Petrucci, Ralph H.	Química general	Pearson-Prentice Hall	978-84-205-3533-3	2010
Quiñoá Cabana, Emilio	Nomenclatura y representación de los compuestos orgánicos :	McGraw-Hill	84-481-4363-9	2005
Raymond Chang	Química	McGraw-Hill	970-10-6111-X	2007
Soto J.L.	Química orgánica: conceptos básicos Volumen I	Síntesis		1996