

**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:** 2021-22**Group(s):** 40**Duration:** C2**Second language:****English Friendly:** Y**Bilingual:** N

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	Tuesdays and Thursdays from 10 to 13h upon appointment.
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	
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 to 13h upon appointment.
Lecturer: MARIA JOSE GOMEZ-ESCALONILLA ROMOJARO - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
Sabatini, despacho 0.5	QUÍMICA INORG., ORG., Y BIOQ.		mariajose.gomez@uclm.es	Tuesdays and Thursdays from 10 to 13h upon appointment.
Lecturer: FERNANDO LANGA DE LA PUENTE - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
Sabatini/0.11	QUÍMICA INORG., ORG., Y BIOQ.		fernando.langa@uclm.es	Tuesdays and Thursdays from 10 to 13h upon appointment.
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 from 1 to 2 and from 3 to 4 p.m. upon appointment.
Lecturer: ARMANDO SÁNCHEZ CACHERO - Group(s): 40				
Building/Office	Department	Phone number	Email	Office hours
ICAM/Laboratorio 0.22	Q. ANALÍTICA Y TGIA. ALIMENTOS		Armando.Sanchez@uclm.es	

**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. Develop those strategies and learning skills necessary to undertake further studies in the area of Biochemistry and Molecular Biology

G05	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 be able to correctly describe the main regulatory solutions of biological importance and most frequently used in biochemistry laboratories.

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.

### 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	-	
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	
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	This activity is compulsory and not recoverable.
Practicum and practical activities report writing or preparation [OFF-SITE]		E01 E19 G05	0.88	22	Y	Y	
Other on-site activities [ON-SITE]	Assessment tests	E01	0.08	2	Y	Y	
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	
Study and Exam Preparation [OFF-SITE]	Self-study	E01 G05 T10	0.38	9.5	N	-	
<b>Total:</b>			<b>6</b>	<b>150</b>			
<b>Total credits of in-class work: 2.4</b>			<b>Total class time hours: 60</b>				
<b>Total credits of out of class work: 3.6</b>			<b>Total hours of out of class work: 90</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

Test	15.00%	15.00%	Lab sessions will be evaluated as follows: 1) written exam (10 %) 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	15.00%	0.00%	Test type exams.
Final test	40.00%	55.00%	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	30.00%	30.00%	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 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	