

**1. General information****Course:** BIOCHEMISTRY**Type:** BASIC**Degree:** 399 - PODIATRY DEGREE**Center:** 16 - FACULTY OF SCIENCES OF THE HEALTH OF TALAVERA**Year:** 1**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 32502**ECTS credits:** 6**Academic year:** 2022-23**Group(s):** 60**Duration:** First semester**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** IRIANA GALAN ARRIERO - Group(s): 60

Building/Office	Department	Phone number	Email	Office hours
Facultad de Ciencias de la Salud Despacho 2.8	CIENCIAS MÉDICAS	926051571	Iriana.Galan@uclm.es	Thursday from 9:00 to 15:00 h Make an appointment by email

**2. Pre-Requisites**

It has not been established previous requirements

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

Biochemistry is one of the basic training subjects, which belongs to the area of knowledge of Health Sciences since it provides knowledge about the structure and function of the human being, understanding it as a biopsychosocial unit in relation to its physical, social and cultural environment, and provides tools for data analysis and interpretation. In general, it encourages the development of logical and critical reasoning. In the podiatry curriculum, it is related to other disciplines of the degree, both basic and physiology, pharmacology and psychology. Within Podiatry Sciences, it is related to the subject of biophysics and biomechanics, orthopedology, chiropodology, general pathology, podiatry pathology, dermatology, podiatry surgery, diagnostic imaging and radiation protection, and clinical podiatry. This course allows students to achieve fundamental professional skills for a good development of their profession, such as knowing and identifying the structure and function of the main macromolecules that make up the human body, understand molecular and physiological bases of cells and tissues, apply technologies and information and communication systems of health care and know the pathophysiological processes and their manifestations and risk factors that determine the states of health and disease at different stages of the life cycle.

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

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CE02	Acquire knowledge about cell and tissue biology. Composition and organization of the matter of living beings. Histology. Genetics.
CE03	Know the subjects of biophysics, physiology and biochemistry related to the human body. Immediate principles. Biochemistry and biophysics of the membranes, muscles and nerves. Acquire knowledge of the functions and regulation of the different organs and systems of the human body
CT01	Know a second foreign language.

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

Identification of the structures and fundamental properties of biomolecules.

Knowledge of the structure and function of the human body.

Relevant knowledge of basic and life sciences.

Ability to apply problem solving and decision making.

**6. Units / Contents****Unit 1: Introduction to Biochemistry. Physicochemical bases of biochemistry: bonds, formulation and isomerism. Water, solutions and acid base balances.****Unit 2: Carbohydrates: Monosaccharides and complex carbohydrates. Main biological functions.****Unit 3: Lipids: fatty acids and lipids. Plasma membranes: structure, properties and functions. Membrane transport.**

Unit 4: Proteins: amino acids, peptides and proteins. Structure and function. Proteins of physiological interest.

Unit 5: Enzymes: properties, classification and enzymatic kinetics. Regulation of enzyme activity. Vitamins and coenzymes. Clinical importance of enzymes.

Unit 6: Nucleic acids, structure and function.

Unit 7: The genetic code and transmission of genetic information. Mutations and mutagenic agents.

Unit 8: Fundamentals of biosynthesis of macromolecules. Cellular transcription and translation mechanisms. Biosynthesis of carbohydrates and lipids.

Unit 9: Principles of metabolism and its regulation.

Unit 10: Biochemistry and biophysics of the cell membrane, muscles and nerves.

#### ADDITIONAL COMMENTS, REMARKS

At the beginning of the course there will be an informative class to present the teaching guide of the subject.

#### 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	CB01 CB02 CB03 CB04 CB05 CE02 CE03 CT01	1.36	34	Y	N	Evaluation will be assessed both in the progress test and the final test. The progress test will be held the second week of November and it does not eliminate content.
Workshops or seminars [ON-SITE]	Combination of methods	CB01 CB02 CB03 CB04 CB05 CE02 CE03 CT01	0.44	11	Y	Y	It will consist of activities, exercises, clinical cases, and practical seminars. Their evaluation will be done by handing over the proposed activities to the professor. Recoverable
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CB01 CB02 CB03 CB04 CB05 CE02 CE03 CT01	0.28	7	Y	Y	Evaluable through a report of practices with the activities carried out that will be delivered the last week of the course. Recoverable
Group tutoring sessions [ON-SITE]	Problem solving and exercises	CB01 CB02 CB03 CB04 CB05 CE02 CE03 CT01	0.12	3	Y	Y	The proposed activities will be delivered to the professor. Recoverable
Final test [ON-SITE]	Assessment tests	CB01 CB02 CB03 CB04 CB05 CE02 CE03 CT01	0.2	5	Y	Y	It will consist in a test exam. Results will be calculated by the formula: $\frac{((\text{Correct answers} - (\text{mistakes}/2)) / \text{Total questions}) \times 10}{1}$
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	CB01 CB02 CB03 CB04 CB05 CE02 CE03 CT01	0.72	18	Y	N	Assessment by a practice report
Analysis of articles and reviews [OFF-SITE]	Self-study	CB01 CB02 CB03 CB04 CB05 CE02 CE03 CT01	0.08	2	Y	N	Evaluation through progress and final exams
Study and Exam Preparation [OFF-SITE]	Self-study	CB01 CB02 CB03 CB04 CB05 CE02 CE03 CT01	2.8	70	Y	N	Evaluation through progress and final exams
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
Progress Tests	20.00%	0.00%	Test type questionnaire. The formula to establish the score is: $\frac{((\text{Correct answers} - (\text{mistakes}/2)) / \text{Total questions}) \times 10}{1}$ . It does not eliminate content.
Final test	60.00%	80.00%	Test type questionnaire. The formula to establish the score is: $\frac{((\text{Correct answers} - (\text{mistakes}/2)) / \text{Total questions}) \times 10}{1}$
Assessment of problem solving and/or case studies	20.00%	20.00%	Present a portfolio with the problems and activities proposed in the seminars and laboratory practices. Attendance is compulsory for all scheduled practical activities.
<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 current rating system will be applied; currently, presently UCLM student evaluation regulations, approved on May 23th, 2022.

The global punctuation will be made by making a weighted average of all the evaluable activities. However, the students must achieve a score of 40% in the final test, to add up all the califications. Attendance at seminars and practices is mandatory.

##### Non-continuous evaluation:

The current rating system will be applied; currently, presently UCLM student evaluation regulations, approved on May 23th, 2022.

Students who opt for this evaluation system will take a final test, which will include the progress test contents and a practical exam where it will be assessed that the student has reached all the competences of the subject.

The calculation of the global mark will be made by making a weighted average of the evaluable activities, however, the students must achieve a score of 40% in each of them.

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

The same criteria will be followed as in the ordinary convocatory, both continuous and non-continuous evaluation.

The assessment of the portfolio and of the practices, which have been passed by the student who chooses continuous evaluation, will be kept, up to a maximum of two academic courses from the current course, considering that the practical activities are not modified.

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

The same criteria will be applied as in the ordinary call, both continuous and non-continuous evaluation.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Final test [PRESENCIAL][Assessment tests]	5
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	18
Analysis of articles and reviews [AUTÓNOMA][Self-study]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	70
<b>General comments about the planning:</b> The temporal distribution of the different training activities during the course will be adapted to the needs of the students and may vary depending on the degree of achievement by criteria of the teachers. The official academic calendar will be followed.	
<b>Unit 1 (de 10): Introduction to Biochemistry. Physicochemical bases of biochemistry: bonds, formulation and isomerism. Water, solutions and acid base balances.</b>	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	1.5
Group 60:	
<b>Initial date:</b> 12-09-2022	<b>End date:</b> 16-09-2022
<b>Unit 2 (de 10): Carbohydrates: Monosaccharides and complex carbohydrates. Main biological functions.</b>	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Workshops or seminars [PRESENCIAL][Combination of methods]	1
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	1.5
Group 60:	
<b>Initial date:</b> 19-09-2022	<b>End date:</b> 23-09-2022
<b>Unit 3 (de 10): Lipids: fatty acids and lipids. Plasma membranes: structure, properties and functions. Membrane transport.</b>	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Workshops or seminars [PRESENCIAL][Combination of methods]	2
Group 60:	
<b>Initial date:</b> 26-09-2022	<b>End date:</b> 02-10-2022
<b>Unit 4 (de 10): Proteins: amino acids, peptides and proteins. Structure and function. Proteins of physiological interest.</b>	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Workshops or seminars [PRESENCIAL][Combination of methods]	2
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	1.5
Group 60:	
<b>Initial date:</b> 03-10-2022	<b>End date:</b> 14-10-2022
<b>Unit 5 (de 10): Enzymes: properties, classification and enzymatic kinetics. Regulation of enzyme activity. Vitamins and coenzymes. Clinical importance of enzymes.</b>	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Workshops or seminars [PRESENCIAL][Combination of methods]	1.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	1.5
Group 60:	
<b>Initial date:</b> 17-10-2022	<b>End date:</b> 28-10-2022
<b>Unit 6 (de 10): Nucleic acids, structure and function.</b>	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Workshops or seminars [PRESENCIAL][Combination of methods]	1.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	1.5
Group 60:	
<b>Initial date:</b> 31-10-2022	<b>End date:</b> 11-11-2022
<b>Unit 7 (de 10): The genetic code and transmission of genetic information. Mutations and mutagenic agents.</b>	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Workshops or seminars [PRESENCIAL][Combination of methods]	1.5
Group 60:	
<b>Initial date:</b> 14-11-2022	<b>End date:</b> 18-11-2022
<b>Unit 8 (de 10): Fundamentals of biosynthesis of macromolecules. Cellular transcription and translation mechanisms. Biosynthesis of carbohydrates and lipids.</b>	

<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Workshops or seminars [PRESENCIAL][Combination of methods]	1.5
Group 60:	
<b>Initial date:</b> 21-11-2022	<b>End date:</b> 02-12-2022
<b>Unit 9 (de 10): Principles of metabolism and its regulation.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	1
Group 60:	
<b>Initial date:</b> 05-12-2022	<b>End date:</b> 16-12-2022
<b>Unit 10 (de 10): Biochemistry and biophysics of the cell membrane, muscles and nerves.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	1.5
Group 60:	
<b>Initial date:</b> 19-12-2022	<b>End date:</b> 23-12-2022
<b>Global activity</b>	
<b>Activities</b>	<b>hours</b>
Workshops or seminars [PRESENCIAL][Combination of methods]	11
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	7
Class Attendance (theory) [PRESENCIAL][Lectures]	34
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	18
Final test [PRESENCIAL][Assessment tests]	5
Group tutoring sessions [PRESENCIAL][Problem solving and exercises]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	70
Analysis of articles and reviews [AUTÓNOMA][Self-study]	2
<b>Total horas: 150</b>	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Herrera, Emilio; Ramos, Pilar; Roca, Pilar; Viana, Marta	Bioquímica Básica	Elsevier		978-84-8086-898-3	2014	
Mathews, Christopher K	Bioquímica	Pearson/Addison Wesley		978-84-7829-053-6	2008	
Lehninger, Albert L	Principios de bioquímica	Omega		978-84-282-1603-6	2015	
Voet, Donald.	Fundamentos de bioquímica: la vida a nivel molecular	Medica panamericana		978-950-06-2314-8	2007	
Peter Ronner	Netter. Bioquímica esencial, Edición 1	Elsevier		9788491135159	2019	
Stryer, Lubert.	Bioquímica	Reverte		978-84-2917-602-5	2013	