



1. General information

Course: INTEGRATED LABORATORY II

Type: CORE COURSE

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: 13329

ECTS credits: 6

Academic year: 2023-24

Group(s): 40

Duration: First semester

Second language: English

English Friendly: Y

Bilingual: N

Lecturer: PILAR FERNANDEZ-PACHECO RODRIGUEZ - Group(s): 40

Building/Office	Department	Phone number	Email	Office hours
Edificio Sabatini. Despacho 26	Q. ANALÍTICA Y TGIA. ALIMENTOS	5486	Pilar.FRodriguez@uclm.es	Tuesday, Wednesday and Thursday from 11 a.m. to 1 p.m.

Lecturer: ISABEL MARTINEZ ARGUDO - Group(s): 40

Building/Office	Department	Phone number	Email	Office hours
Sabatini/01	CIENCIA Y TECNOLOGÍA AGROFORESTAL Y GENÉTICA	925 268 800	isabel.margudo@uclm.es	Monday to Friday 1:00-2:00 p.m. Monday 4:00-5:00 p.m. In any case, contact by email to make an appointment.

Lecturer: EDUARDO MOLTO PEREZ - Group(s): 40

Building/Office	Department	Phone number	Email	Office hours
ICAM/0.30	QUÍMICA INORG., ORG., Y BIOQ.	926051477	eduardo.molto@uclm.es	Appointment by email: Tuesday, Wednesday and Thursday from 11 a.m. to 1 p.m.

2. Pre-Requisites

Not established

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

Not established

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
E18	To know the principles of the manipulation of nucleic acids, as well as the techniques that allow the study of the gene function and the development of transgenic organisms with applications in biomedicine, industry, environment, agriculture, etc.
G01	To possess and understand the knowledge in the area of Biochemistry and Molecular Biology at a level that, based on advanced textbooks, also includes cutting-edge aspects of relevance in the discipline
G02	To know how to apply the knowledge of Biochemistry and Molecular Biology to professional practice and to possess the necessary intellectual skills and abilities for this practice, including the capacity for: information management, analysis and synthesis, problem solving, organization and planning and generation of new ideas.
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.
G04	To know how to transmit information, ideas, problems and solutions in the field of Biochemistry and Molecular Biology to a specialized and non-specialized public.
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.
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
T02	User-level knowledge of Information and Communication Technologies (ICT).
T04	Ethical commitment and professional deontology
T08	Ability to work as a team and, where appropriate, exercise leadership functions, encouraging entrepreneurship

5. Objectives or Learning Outcomes

Course learning outcomes

Description

To be able to express oneself correctly with the appropriate terms about the different genetic and molecular processes that occur in the cell.

Solve and design experiments in the field of Molecular Biology.

Know how to apply molecular techniques for the identification and genotyping of microorganisms of industrial interest.

To know the basic fundamentals of the most frequent instrumentation in Molecular Biology laboratories.

Acquire the basic concepts necessary for the use of recombinant DNA technology.

To understand the potential applications of molecular biotechnology in agriculture, food, medicine, environment and industry and the main current trends and future challenges.

Acquire the necessary scientific criteria to develop professional ethics in the application of genetic engineering and biotechnology.

To understand the molecular mechanisms responsible for gene expression and its regulation in prokaryotes and eukaryotes.

Become familiar with the scientific literature and with the search for and communication of scientific information.

To know the techniques used to obtain genetically modified microorganisms, plants and animals.

Additional outcomes

6. Units / Contents

Unit 1: Monitoring of starter culture in yoghurt fermentation

Unit 1.1 preparation of media and reagents

Unit 1.2 Use of RAPD-PCR technique

Unit 2: Generation of mutant versions of D-lactate dehydrogenase

Unit 2.1 Cloning strategy

Unit 2.2 Primer design

Unit 2.3 Cloning of wild-type and mutant versions of Lactate dehydrogenase

Unit 3: Purification and functional characterization of the wild and mutant versions of D-lactate DH obtained.

Unit 3.1 Expression and purification of the wild and mutant versions of D-lactate DH obtained as fusion proteins

Unit 3.2 Determination of LDH activity in the obtained versions

Unit 3.3 Detection of recombinant proteins by Western-blot

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	T01	2.04	51	Y	Y	Laboratory practices. Assistance is compulsory and non-reschedulable
Workshops or seminars [ON-SITE]	Workshops and Seminars	E01 E13 E18 G04	0.24	6	Y	N	Completion of task related with the experimental design. Non-reschedulable.
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	E01 E13 G03	2	50	Y	N	Practical activities report. Non-reschedulable
Other off-site activity [OFF-SITE]	Reading and Analysis of Reviews and Articles	E01 E13 G03	0.4	10	N	-	Report preparation
Study and Exam Preparation [OFF-SITE]	Self-study	E01 E13 G03	1.2	30	N	-	Preparation of final test
Final test [ON-SITE]	Assessment tests	E01 G04	0.12	3	Y	Y	Final test of the subject. Reschedulable
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
Final test	74.00%	80.00%	Final exam. Reschedulable
Other methods of assessment	6.00%	0.00%	Student will submit answer to several cuestionnaires. Non-reschedulable
Practicum and practical activities reports assessment	20.00%	20.00%	Students will prepare a report of the practices carried out in the laboratory, in which the results obtained will be described and discussed. The report also will include an abstract of the work done. Non-reschedulable
Total:	100.00%	100.00%	

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:

It is mandatory to obtain a score > 4 over 10 in the final exam to add all other evaluable parts in the percentages shown in the table.

The subject will be considered as passed if a minimum overall weighted score of 5 out of 10 is obtained.

Non-continuous evaluation:

Same as continuous

Specifications for the resit/retake exam:

For the retake exam the criteria will be the same as for the final exam

Specifications for the second resit / retake exam:

To pass this examination there will be only a final exam that will represent 100% of the mark, provided that the laboratory sessions have been performed.

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
A. Herraéz	Biología Molecular e Ingeniería Genética			978-848086-647-7	2012	
Brock, Thomas D.	Brock, biología de los microorganismos	Prentice Hall		84-89660-36-0	2001	
Green and Sambrook	Molecular Cloning. A laboratory manual. 4th edition			978-1936113422	2012	
Yousef, Ahmed E.	Microbiología de los alimentos : manual de laboratorio	Acribia		10-84-200-1066-9	2006	
	Algoritmo para la generación de alineamientos múltiples (ClustalW)					http://www.ebi.ac.uk/clustalw/index.html
	Programa de visualización de estructuras tridimensionales (RasMol)					http://rasmol.org/
	Protein Data Bank					http://www.rcsb.org/pdb/home/home.do
	Uniprot					http://www.uniprot.org/