

## SUBJECT TEACHING GUIDE

G1926 - Genetic Engineering

Degree in Biomedical Sciences

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Biomedical Sciences			Type and Year	Compulsory. Year 2
Faculty	Faculty of Medicine				
Discipline	GENETICS				
Course unit title and code	G1926 - Genetic Engineering				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. BIOLOGIA MOLECULAR				
Name of lecturer	MARIA JESUS LUCAS GAY				
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Other lecturers	MATXALEN LLOSA BLAS MARIA PILAR GARCILLAN BARCIA JORGE RIPOLL ROZADA MARIA DEL MAR QUIÑONERO CORONEL ANDREA FERNANDEZ GOMEZ				

### 3.1 LEARNING OUTCOMES

- Apply a number of techniques of isolation, sequencing, hybridization, amplification, bioinformatic analysis, and manipulation of nucleic acids.
- Choose between different strategies for cloning and gene modification.
- Solve strategies for gene expression and production of heterologous proteins using the appropriate technologies.
- Identify the methodologies for the construction of genetically modified organisms and their applications in biomedicine.

**4. OBJECTIVES**

Successfully acquire the learning outcomes of the subject indicated above.

**6. COURSE ORGANIZATION**

CONTENTS

1	<p>The subject consists of theory classes, classroom practices, laboratory training, and computer-based exercises, with the following program:</p> <ul style="list-style-type: none"> <li>1- Introduction</li> <li>2- Manipulation of purified nucleic acids</li> <li>3- Basic enzymology for genetic engineering</li> <li>4- Recombinant DNA technology</li> <li>5- PCR and its applications</li> <li>6- Genomic analysis and manipulation techniques</li> <li>7- Production of recombinant proteins</li> <li>8- Protein engineering</li> <li>9- Biofactories</li> <li>10- Molecular diagnostics</li> <li>11- Gene Therapy</li> <li>12- Techniques for creating transgenic animals and plants</li> <li>13- Biotechnology and society</li> </ul>
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7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Exam 1	Written exam	No	Yes	32,50
Exam 2	Written exam	Yes	Yes	32,50
Group work	Work	No	No	10,00
Continuous assessment	Activity evaluation with Virtual Media	No	No	10,00
Laboratory training	Work	No	No	10,00
Computer lab sessions	Activity evaluation with Virtual Media	No	No	5,00
TOTAL				100,00
<b>Observations</b>				
<p>Final grade: The final grade (maximum 10 points) will be the sum of the marks obtained in each evaluation method. The final grade must be equal to or greater than 5 points to pass the subject.</p> <p>Exams: 2 written exams will be held on the dates that appear in the academic year calendar. Each exam will have a maximum value of 3.25 points (32.5% of the maximum final grade). Each exam can be released if at least a grade of 4 points out of 10 is obtained. If the student does not pass the required grade in any of the partial exams, he/she can recover it in the extraordinary call. Partial grades are kept during the course in which they were obtained. The exam may consist of different types of questions about the contents of the program: multichoice, problems, questions with true/false answers, text with gaps to fill in, short answers, and essay questions. Its structure will be announced sufficiently in advance by the professors in charge of teaching the corresponding subject.</p> <p>Group work: Work carried out in a group on a topic among those proposed by the teaching staff that will be presented orally . Proposals for work topics by students will also be accepted. The teachers will establish the evaluation criteria to be taken into account. The maximum grade that can be obtained is 0.5 points (5% of the maximum final grade).</p> <p>Continuous assessment: Participation in class, answers to follow-up questions that will be asked during classes (Socratic system) and questionnaires on the Moodle platform will be graded with up to 1 point (10% of the maximum final grade).</p> <p>Laboratory training: To evaluate the laboratory training, each student must submit a report that will include a theoretical summary, the results obtained, the conclusions, and the answers to the questions posed. The report will be graded with up to 1 point on the final grade. There will be a score penalty if plagiarism is detected due to copying external documents or other students' reports. Any change in a group of practices by the student must have an officially justified reason , and the responsible professor will be requested well in advance so that she authorizes it if she considers the reason for the change duly justified.</p> <p>Bioinformatics training: Two bioinformatics hands-on training sessions will be carried out. For each session, a task will be assigned to each student valued with up to 0.25 points.</p>				
<b>Observations for part-time students</b>				
Part-time students must attend all compulsory practical sessions and take the evaluation described for the rest of the students.				

**8. BIBLIOGRAPHY AND TEACHING MATERIALS**

## BASIC

Técnicas de Ingeniería Genética. Primera Edición (2017). María Dolores Real, Carolina Rausell, Amparo Latorre. Editorial Síntesis. ISBN: 978-849171071

Molecular Biotechnology: Principles and Applications of Recombinant DNA. Sixth Edition (2022). Berhard R. Glick and Chery L. Patten. ASM Press. ISBN 978-1-68367-364-4

Gene Cloning and DNA Analysis: An Introduction. Eighth Edition (2020). T. A. Brown. Wiley-Blackwell. ISBN: 978-1-119-64078-3

A handbook of gene and cell therapy. First Edition (2020). Clévio Nóbrega, Liliana Mendonça, Carlos A. Mato. Springer Nature Switzerland. ISBN: 978-3-030-41335-4