

## SUBJECT TEACHING GUIDE

G1926 - Genetic Engineering

Degree in Biomedical Sciences

Academic year 2024-2025

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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Office	Edificio IBBTEC. Planta: + 3. DESPACHO (308)				
Other lecturers	MATXALEN LLOSA BLAS 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. SUBJECT PROGRAM**

**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- Synthetic biology</li> <li>10- Metabolic engineering</li> <li>11- Molecular diagnostics</li> <li>12- Transgenic animals and plants. Cloning of organisms.</li> <li>13- Gene Therapy</li> <li>14- 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	35,00
Exam 2	Written exam	Yes	Yes	35,00
Continuous assessment	Activity evaluation with Virtual Media	No	No	12,00
Laboratory training	Work	No	No	12,00
Computer lab sessions	Activity evaluation with Virtual Media	No	No	6,00
<b>TOTAL</b>				<b>100,00</b>
<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: Two written exams will be held on the dates specified in the academic calendar . Each exam will have a maximum value of 3.5 points. Each exam can be exempted if a grade of at least 4 points out of 10 is obtained. If the student does not achieve the required grade in any of the partial exams, he/she can retake it in the extraordinary call. Partial grades are kept during the course in which they were obtained. The exams may consist of different types of questions about the program contents: multiple-choice, problems, true/false questions, fill-in-the-blank text, short answers, and essay questions. The structure will be announced sufficiently in advance by the professors in charge of the corresponding subject .</p> <p>Continuous Assessment: Participation in class, answers to follow-up questions asked during classes (using the Socratic system), and questionnaires on the Moodle platform will be graded with up to 1.2 points.</p> <p>Laboratory Training: For the evaluation of the laboratory work, each pair of students 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 1.2 points 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 practice group by the student must have an officially justified reason and must be requested well in advance from the responsible professor, who will authorize the change if the reason is deemed duly justified.</p> <p>Computer-Based Training: Two computer-based exercises will be carried out. For each session, an individual task will be assigned to each student, valued at up to 0.6 points on the final grade.</p>				
<b>Observations for part-time students</b>				
Part-time students must attend all compulsory practical sessions and complete the same evaluations as the other students.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
<b>BASIC</b>
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). Bernhard 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

