

SUBJECT TEACHING GUIDE

431 - Current Advances and Future Trends in Molecular and Cellular Microbiology

University Master's Degree in Molecular Biology and Biomedicine

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	University Master's Degree in Molecular Biology and Biomedicine			Type and Year	Optional. Year 1
Faculty	Faculty of Medicine				
Discipline	Optional Subjects Module				
Course unit title and code	431 - Current Advances and Future Trends in Molecular and Cellular Microbiology				
Number of ECTS credits allocated	5	Term	Semester based (1)		
Web					
Language of instruction	English	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. BIOLOGIA MOLECULAR
Name of lecturer	FELIX JAVIER SANGARI GARCIA
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Office	Facultad de Medicina. Planta: + 1. DESP FELIX SANGARI GARCIA (1118)
Other lecturers	MATXALEN LLOSA BLAS GABRIEL MONCALIAN MONTES MARIA PILAR GARCILLAN BARCIA MARIA JESUS LUCAS GAY RAUL FERNANDEZ LOPEZ ANA ROSA PALANCA CUÑADO MAGDALENA MARIA FOLTMAN MARTA ROBLEDO GARRIDO ZAIRA MOURE GARCIA

3.1 LEARNING OUTCOMES

- Ability to read and critically interpret scientific works on Molecular and Cellular Microbiology.
- Recognize the importance of advances in the field of Molecular and Cellular Microbiology, especially its application to solve problems in human health or advance the development of biotechnology.
- Describe the main characteristics and applications of massive sequencing techniques.
- Describe and apply the tools for assembly, annotation, visualization and analysis of genomic data.
- Identify and characterize genomic sources and display formats, along with genomic annotation.
- List the different microorganisms that affect health and disease in plants and animals, including humans.
- Describe the latest methods in the molecular diagnosis of pathogens, as well as the different methods of identifying their antimicrobial resistance mechanisms.
- Recognize the crucial role of Microbiology in addressing the enormous variety of problems faced by humanity.

4. OBJECTIVES

- Learn about the most recent advances in knowledge in the area of Molecular and Cellular Microbiology
 - Know the available technologies and their applicability to the field of research in Molecular and Cellular Microbiology
- Be able to raise and address a research topic in the field of Microbiology, using all types of techniques.

6. SUBJECT PROGRAM

CONTENTS

1	<p>Lecture 1. Bacterial replication and Transcription. Lecture 2. Bacterial genome plasticity. Lecture 3. Molecular Mechanisms of pathogenicity in intracellular bacteria. Lecture 4. High-throughput sequencing. Lecture 5. Bacterial genome sequencing, assembly and annotation. Metagenomes. Lecture 6. Molecular analysis of microbial communities. Practical session (Computer room): Artemis, ACT and the Blast+ suite. Installation, use and applications. Lecture 7. Bacterial Secretion Systems. Lecture 8. Advance Microscopy in the field of Molecular and Cellular Microbiology. Lecture 9. ncRNAs regulation in bacteria. Lecture 10. Study of molecular interactions between plants and bacteria. Lecture 11. Circadian cycle in microorganisms. Lecture 12. Virology 101. Lecture 13. Saccharomyces cerevisiae as a model organism in research. Lecture 14. Molecular diagnosis and typing of of microorganisms of clinical interest. Lecture 15. Antibiotic resistance. Determination of susceptibility in the clinical laboratory. Most serious clinical problems arising from the resistance Lecture 16. Non conventional Microbiology</p> <p>This Syllabus is approximate, and the final classes will be announced before the start of the course.</p>
2	<p>At the end of the course each student will have to defend a short presentation about one of the topics of the course</p>

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Attendance and Continuous assessment in class (60%)	Others	Yes	Yes	60,00
Final presentation (40%)	Activity evaluation with Virtual Media	Yes	No	40,00
TOTAL				100,00
Observations				
Attendance at the practical session is mandatory and cannot be recovered. Absences must be justified to be recoverable. Each unjustified or unrecovered absence will be penalized with 0.5 points on the final grade. To pass the subject you will not be able to have more than two unrecovered classes.				
Observations for part-time students				
The same form of evaluation will be applied to part-time students.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
- Bacterial Pathogenesis. Pascale Cossart, Stanley Maloy, eds. CSH Laboratory Press, 2014
- Molecular Microbiology: Diagnostic Principles and Practice, 2 Edition. Editor in Chief: David H. Persing. ASM Press. 2010
- Fields. Virología. 7ª Edición. Editores Peter M. Howley, David M. Knipe. Editorial Lippincott Williams & Wilkins, 2020