

**INTER AMERICAN UNIVERSITY OF PUERTO RICO
METROPOLITAN CAMPUS
SCHOOL OF SCIENCE AND TECHNOLOGY
NATURAL SCIENCE DEPARTMENT
MASTER'S IN SCIENCE IN MOLECULAR MICROBIOLOGY**

SYLLABUS

I. GENERAL INFORMATION

Course Title	:	Recombinant DNA Techniques
Code and number	:	MOMI 6331
Credits	:	3
Academic term	:	
Instructor	:	
Office hours and location	:	
Office telephone	:	
E-mail	:	

II. DESCRIPTION

Application of the concepts of recombinant DNA technology to the cloning and expression of genes as diagnostic tools. It requires 30 hours of lecture and 45 hours of closed laboratory.

III. OBJETIVES

It is expected that at the end of the course, the student will be able to:

1. Specify common techniques used for gene expression.
2. Evaluate the usefulness of molecular techniques such as electrophoresis, restriction enzyme mapping, plasmid construction, expression vectors, and sequencing for gene study.
3. Evaluate the importance of Recombinant DNA Technology in the study and differentiation of genes and its application in the pharmaceutical industry.
4. To develop skills in molecular techniques.

Competencies of the graduate profile addressed in this course:

1. Apply methodologies of recombinant DNA technology in scientific research directed to the solution of molecular microbiology problems.
2. Argue ideas and results of research, before the scientific community, orally and in writing, in Spanish and English.
3. Values the importance of ethical standards related to scientific conduct in research, respect for the confidentiality of genetic information and the defense of intellectual property.

4. Proposes solutions based on molecular biology technologies to address situations of depredation and despoilment of ecological environments.

IV. CONTENT

- A. Cloning and Gene Expression
 1. DNA Isolation
 2. Bacterial growth
 3. Isolation of genomic DNA
 4. Plasmid preps
- B. Electrophoresis
 1. Applications of DNA electrophoresis
 2. Protein electrophoresis applications
- C. DNA analysis with restriction enzymes
 1. Applications of DNA electrophoresis
 2. Applications of protein electrophoresis
- D. Polymerase Chain Reaction (PCR) Applications
 1. Primer Design
 2. DNA amplification applications
 3. PCR variants
- E. Construction of Recombinant Plasmids and Expression Vectors
 1. DNA Quantification
 2. Binding of DNA pieces (Ligation)
 3. Transformation of recombinant plasmids into bacteria
 - a) Method to make competent bacteria
 - b) Rapid transformation method
- F. Techniques applied to protein purification
 1. Induction and expression of recombinant proteins
 2. Chromatographic applications
 3. Electrophoretic applications

V. LEARNING ACTIVITIES

1. Illustrated lectures in power point format.
2. Simulations and virtual methods
3. Laboratory practices
4. Additional readings available online on the Blackboard platform.
5. Study and discussion of research cases applied to immunology.

VI. EVALUATION

The evaluation of the course will be based on:

	Score	% of Final Grade
2 Exams	200	50
Laboratory reports	200	50
Total	400	100

VII. SPECIAL NOTES

A. Auxiliary services or special needs

All students who require auxiliary services or special assistance must request these at the beginning of the course or as soon as they know that they need them, through the proper registry, in the Office of Orientation with Sr. José Rodríguez.

B. Honesty, fraud, and plagiarism

Dishonesty, fraud, plagiarism and any other inappropriate behavior in relation to academic work constitutes major infractions sanctioned by the General Student Regulations. The major infractions, as stated in the General Student Regulations, may have as a consequence, suspension from the University for a definite period greater than one year or the permanent expulsion from the University, among others sanctions.

C. Use of electronic devices

Cellular telephones and any other electronic device that could interrupt the teaching and learning processes or alter the environment leading to academic excellence will be deactivated. Any urgent situation will be dealt with, as appropriate. The handling of electronic devices that allow students to access, store or send data during evaluations or examinations is prohibited.

D. Compliance with the Provisions of Title IX

The Federal Higher Education Act, as amended, prohibits discrimination because of sex in any academic, educational, extracurricular, and athletic activity or in any other program or function, sponsored or controlled by a higher education institution, whether or not it is conducted within or outside the property of the institution, if the institution receives federal funds.

In harmony with the current federal regulation, in our academic unit an Assistant Coordinator of Title IX has been designated to offer assistance and orientation in relation to any alleged incident constituting discrimination because of sex or gender, sexual harassment or sexual aggression. The Assistant Coordinator, Sr. George Rivera, can be reached by phone at 787-250-1912, extension 2262 o 2147, or by e-mail griverar@metro.inter.edu.

The Normative Document titled Norms and Procedures to Deal with Alleged Violations of the Provisions of Title IX is the document that contains the institutional rules to direct any complaint that appears to be this type of allegation. This document is available in the Web site of Inter American University of Puerto Rico (www.inter.edu).

VIII. EDUCATIONAL RESOURCES

Textbooks

Assigned readings and information from the manufacturers of the laboratory materials that will form the laboratory manual will be used.

IX. BIBLIOGRAPHY

Textbooks

Cell and Molecular Biology: concepts and Experiments 6th Edition, 2010. Gerald Karp. John Wiley and Sons, Inc. Hoboken, NJ. ISBN: 13 9780470483374

Molecular Cloning: A laboratory Manual, 4th Ed. Sambrook, Rusell and Maniatis. 2012. Cold Spring Harbor Laboratory Press. ISBN-13: 978-1936113422

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