

**INTERAMERICAN UNIVERSITY OF PUERTO RICO  
METROPOLITAN CAMPUS  
DEPARTMENT OF NATURAL SCIENCES  
MASTER OF SCIENCE PROGRAM IN MOLECULAR MICROBIOLOGY**

**SYLLABUS**

**I. GENERAL INFORMATION**

COURSE TITLE	:	<b>Molecular Diagnosis</b>
Code and Number:		<b>MOMI 6500</b>
Credits:		3
Academic Term:		2021-13
Teacher:		
Office Hours:		
Office Phone:		(787) 250-1912
Email:		@intermetro.edu

**II. DESCRIPTION**

Evaluation of the use of biomarkers and validation of methods for the molecular diagnosis of infectious diseases. Identification of the ethical and legal aspects of the privacy of genetic information.

**III. OBJECTIVES**

1. It is expected that at the end of the course, the student will be able to:
  1. Specify the microorganisms that can be identified by molecular techniques.
  2. Specify what it is a biological marker and its application for the molecular diagnosis of infectious diseases.
  3. Understand the validation processes used for molecular testing.
  4. Apply the pre-analytical, analytical and post-analytical phase requirements for molecular tests.
  5. Demonstrate understanding of the purpose, principles and interpretation techniques used for molecular diagnosis.
  6. Demonstrate respect for genetic information and assess the impact that such information brings to society.

## Competencies of the graduate's profile that are attended in the course

1. C1. To establish the importance of microbiology in the genomic era, in aspects related to human health and the balance of ecosystems.
2. C2. Evaluate scientific information from various sources
3. D1. Apply molecular microbiology methodologies in scientific research aimed at solving problems.
4. A1. Assess the importance of ethical standards related to scientific conduct in research, respect for confidentiality and the defense of intellectual property.

## IV. THEMATIC CONTENT

### A. Microorganisms of clinical importance that can be identified by molecular techniques

1. MRSA
2. C. difficile
3. Respiratory pathogens (STD)
4. Virus, HIV: Viral Load

### B. Biological Marker

Proteomics, analysis of proteins expression as a result of infectious agent in humans or microorganisms.

### C. Methods of identification by characterization: Phenotype vs genotype

### D. The use of molecular techniques in the laboratory for molecular diagnosis:

1. Plasmid analysis,
2. Chromosomal DNA analysis: Southern hybridization.
3. PCR-based techniques
  - a. RFLP
  - b. REP
  - c. RAPD
  - d. PCR Fingerprinting
  - e. Pulsed-Filed gel electrophoresis (PFGE)
4. Multi-locus sequence typing (MLST)
5. New emerging disciplines

### E. Quality control: in Platforms for DNA amplification

1. factors affecting sampling
2. Manual vs automated systems
3. Validation of methods

### F. Quality Assurance

### G. Ethics

1. Fundamental principles of ethics applied to research

2. Scientific misconduct
3. Established guidelines and standards in molecular medicine
4. Privacy and confidentiality
5. Internal and external regulations
6. Patents

## V. ACTIVITIES

1. Information search exercises: Reading articles
2. Oral presentations
3. Conference
4. Group work in the classroom

## VI. EVALUATION

The final grade will be calculated on a 100% basis as follows:

Component	Description	Percentage
2 comprehensive exams	50 points	70%
Presentations, group discussions	Face-to-face and virtual	30%

## VII. SPECIAL NOTES

### 1. Ancillary services or special needs

Any student who requires auxiliary services or special assistance must request them at the beginning of the course or as soon as he acquires knowledge that he needs them, through the corresponding registration, in the Orientation Office with Mr. José Rodríguez.

### 2. Honesty, fraud and plagiarism

Dishonesty, fraud, plagiarism and any other inappropriate behavior in relation to academic work constitute major infractions sanctioned by the General Student Regulations. Major infractions, as provided for in the General Student Regulations, may result in the suspension of the University for a defined period of more than one year or the permanent expulsion from the University, among other sanctions.

### 3. Use of electronic devices

Cell phones and any other electronic device that could interrupt teaching and learning processes or alter the environment conducive to academic excellence will be deactivated. Pressing situations will be addressed, as appropriate. The handling of electronic devices that allow access, storage or sending data during evaluations or exams is prohibited.

#### **4. Compliance with the provisions of Title IX**

The Federal Higher Education Act, as amended, prohibits discrimination on the basis of sex in any academic, educational, extracurricular, athletic, or any other program or employment, sponsored or controlled by an institution of higher education regardless of whether it is conducted on or off the institution's premises, if the institution receives federal funds.

In accordance with current federal regulations, our academic unit has appointed a Title IX Assistant Coordinator who will provide assistance and guidance regarding any alleged incident constituting discrimination based on sex or gender, sexual harassment or assault. Mr. George Rivera, Assistant Coordinator, can be reached at 787-250-1912 extension 2262 or 2147 or email [griverar@metro.inter.edu](mailto:griverar@metro.inter.edu).

The Normative Document entitled Norms and Procedures to Address Alleged Violations of the Provisions of Title IX is the document that contains the institutional rules to channel any complaint that is filed based on this type of allegation. This document is available on the website of the Inter-American University of Puerto Rico ([www.inter.edu](http://www.inter.edu)).

### **VIII. EDUCATIONAL RESOURCES**

#### **Textbook(s)**

Pearson David. (2010). Molecular Microbiology. 2nd Edition.

### **IX. BIBLIOGRAPHY**

Trent, R.J. (2012). Molecular Medicine: Genomics to Personalized Health care. Elsevier Science.