UNIVERSITY OF PUERTO RICO
MEDICAL SCIENCES CAMPUS
SCHOOL OF MEDICINE

PHYSIOLOGY DEPARTMENT

COURSE DESCRIPTION

COURSE TITLE: **MATHEMATICS FOR BIOLOGISTS: GRAPHIC DATA ANALYSIS**

COURSE CODE: **FISA 8518**

CREDIT HOURS: **2 CREDITS (36 HOURS)**

COURSE DURATION**:** **18 WEEKS**

NUMBER OF STUDENTS: **MIN.: 5 MAX.: 8**

COORDINATOR NAME: **DR. JAIME BERNSTEIN**

COORDINATOR OFFICE HOURS: **TO BE ARRANGED**

COORDINATOR OFFICE: **A686**

COURSE HOURS: **TO BE ARRANGED (2.0 HRS. /WEEK)**

WHEN WILL BE OFFERED: ____ QUATERLY _**X**_ SEMESTER
____ YEAR ___ SUMMER

PREREQUISITE: **FISA 8601 & FISA 8602**

COURSE JUSTIFICATION: **Graduate students need to be able to understand and use principles of data analysis and to be particularly aware of the usefulness and power of graphic data analysis.**

COURSE DESCRIPTION: **Studies of the following concepts: the function concept; function derivative; rules to obtain derivatives; exponential functions; integral calculus; geometric interpretation of derivatives; some differential equations.**

The course deals with concepts and methods applicable to analysis of data, specifically graphic data analysis, using software programs routinely used in research programs across the nation. The course also consists of hands-on experience in curve fitting, enzyme kinetics, pharmacologic analysis, and physiologic processes in general, including peak analysis.

COURSE OBJECTIVES AND EXPECTED OUTCOMES:

1. To enable students to understand the methods and principles of graphic data analysis, as well as to familiarize them with the use of some pertinent software which is commonly used in curve fitting.

The students should provide proficiency with the course objectives, that will be measured by analysis, integration and comparison of the above mentioned concepts, that will be evaluated through multiple choice questions, essay exams, term papers, presentations and/or publications.

COURSE TOPICS AND TIME DISTRIBUTION:

Part A. Data Treatment
Week 1. Visual inspection of data
Week 2. Editing and performance of calculations
Week 3. Area normalization
Week 4. Cumulative area
Week 5. Nonparametric digital filter
Week 6. Sectioning and graphic processing
Week 7. Baseline substraction
Week 8. Fourier Domain Editing
Week 9. Smoothing: Automated FFT, Loess, Savitzky-Golay

Part B. Curve Fitting
Week 10-11. Automatic Curve Fitting (Using Table Curve)
Week 12-13. Automatic Peak Fitting by the Residuals Method (Using PeakFit)
Week 14-15. Criteria used to determine the best fit
Week 16. True iterative procedures and the building of specific functions
Week 17. The derivative and integration of fitted curves
Week 18. Exam

TEACHING STRATEGIES:

METHODS:

Lectures
Discussion periods
Computer based learning
Take-home projects

RESOURCES:

Power Point
Hand outs
Blackboard

ESSENTIAL REQUIREMENTS:

Attendance
Class Participation

EVALUATION STRATEGIES:

Exam I	**90%**
Class attendance and participation	**10%**
	100%

EVALUATION SYSTEM:

90-100 % = A
80-89 % = B
70-79 % = C
<70 % = F

BIBLIOGRAFY:

Manuals provided with software will be available to students.

REASANOBLE ACCOMODATION STATEMENT:

STUDENTS WITH A HEALTH CONDITION OR SITUATION THAT, ACCORDING TO THE LAW, MAKES THEM ELIGIBLE FOR REASONABLE ACCOMMODATION HAVE THE RIGHT TO SUBMIT A WRITTEN APPLICATION TO THE PROFESSOR AND THE DEAN OF THEIR FACULTY, ACCORDING TO THE PROCEDURES ESTABLISHED IN THE DOCUMENT SUBMITTAL PROCESS FOR REASONABLE ACCOMMODATION OF THE MEDICAL SCIENCES CAMPUS. A FREE COPY OF THIS DOCUMENT MAY BE OBTAINED AT THE OFFICE OF THE DEAN FOR STUDENT AFFAIRS, SECOND FLOOR OF THE SCHOOL OF PHARMACY BUILDING; PHONE 787-758-2525 EXT. 5203. A COPY MAY ALSO BE OBTAINED AT THE OFFICE OF THE FACULTY DEANS AS WELL AS IN THE MSC WEB PAGE. THE APPLICATION DOES NOT EXEMPT THE STUDENT FROM COMPLYING WITH THE ACADEMIC REQUIREMENTS PERTAINING TO THE PROGRAMS OF THE MEDICAL SCIENCES CAMPUS.

ACADEMIC INTEGRITY

The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Student Bylaws (Certification JS 13 2009–2010) states that "academic dishonesty includes but is not limited to: fraudulent actions, obtaining grades or academic degrees using false or fraudulent simulations, copying totally or partially academic work from another person, plagiarizing totally or partially the work of another person, copying totally or partially responses from another person to examination questions, making another person to take any test, oral or written examination on his/hers behalf, as well as assisting or facilitating any person to incur in the

aforementioned conduct". Fraudulent conduct refers to "behavior with the intent to defraud, including but not limited to, malicious alteration or falsification of grades, records, identification cards or other official documents of the UPR or any other institution." Any of these actions shall be subject to disciplinary sanctions in accordance with the disciplinary procedure, as stated in the existing UPR Student Bylaws.

DISCLAIMER: The above statement is an English translation, prepared at the Deanship of Academic Affairs of the Medical Sciences Campus, of certain parts of Article 6.2 of the UPR Student Bylaws "Reglamento General de Estudiantes de la Universidad de Puerto Rico", (Certificación JS 13 2009-2010). It is in no way intended to be a legal substitute for the original document, written in Spanish.