

**UNIVERSITY OF MEDICINE AND DENTISTRY OF NEW JERSEY**  
**GRADUATE SCHOOL OF BIOMEDICAL SCIENCES**  
**STRATFORD DIVISION**

**COURSE CATALOG**

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**Please note that Certificate students are NOT allowed to take any School of Osteopathic Medicine courses.**

**Please note that Non-matriculated students are NOT allowed to take any School of Osteopathic Medicine courses or any Rutgers-Camden courses.**

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This catalog represents a program of the current curricula, educational plans, offerings and requirements of the UMDNJ-Graduate School of Biomedical Sciences. The School reserves the right to change any provisions, offerings, tuition, fees, or requirements at any time within the student's period of study at UMDNJ. In addition, UMDNJ may at any time eliminate, modify or change the location of any School, Institute, Center, Program, Department, course or academic activity."

## Cell and Molecular Biology Program: Ph.D.; D.O./Ph.D.; M.S. (thesis only)

### Course Descriptions

<b>MBIO 5020</b>	<b>GRADUATE BIOCHEMISTRY</b>	<b>FALL</b>	<b>4 Credits</b>	<b>CORE COURSE</b>
<b>COURSE DIRECTORS: DR. SERGEI BORUKHOV</b>				
<b>T,TH 3:00-5:00 PM SC-145</b>				
<b>REQUIRED TEXT: Lehninger Principles of Biochemistry, 4th Edition</b>				
<b>ISBN: 0-7167-4339-6</b>				
D.L. Nelson and M.M. Cox W.H. Freeman and Company Publishing, 2007.				
This is a problems-oriented biochemistry course that requires substantial student participation in class. The course covers the major areas of biochemistry including - DNA, RNA, protein, carbohydrate and lipid structure and biosynthesis; enzyme kinetics; carbohydrate, lipid and nucleotide metabolism; DNA replication, repair and recombination. Class-time consists of an engaging dialog on learning objectives and problems in various aspects of biochemistry. Previous exposure to biochemistry is helpful but not required. Students are required to come to class prepared to address the learning objectives and discuss the problems relevant to each section of the course.				
<b>MBIO 5021</b>	<b>MOLECULAR BIOLOGY OF THE CELL</b>	<b>SPRING</b>	<b>4 Credits</b>	<b>CORE COURSE</b>
<b>COURSE DIRECTOR: DR. MICHAEL HENRY</b>				
<b>T,TH 3:00-5:00 PM SC-145</b>				
<b>REQUIRED TEXT: Molecular Biology of the Cell, 4th Edition</b>				
B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter. Garland Publishing, 2002.				
This course is the cornerstone of the graduate curriculum and is taken in the Spring semester of the student's first year of graduate study. There are four sections to this course: I. Introduction to the cell. This section includes evolutionary aspects of the cell, a study of small molecules, energy metabolism and biosynthesis, macromolecular structure and function. II. Molecular genetics, including protein function, genetic mechanisms, recombinant DNA technology, the cell nucleus, and the control of gene expression. III. Internal organization of the cell, including membrane structure, transport mechanisms, cell signaling, cell division and the mechanisms controlling the phases of the cell-cycle. IV. Cells in their social context, including cell junctions, cell adhesion, germ cells and fertilization, cellular mechanisms of development, differentiation and tissue formation, the immune system and cancer.				
<b>MBIO 5001</b>	<b>ETHICS IN SCIENCE, RESEARCH AND SCHOLARSHIP</b>	<b>SPRING</b>	<b>2 Credits</b>	<b>REQUIRED COURSE</b>
<b>COURSE DIRECTOR: DR. KATRINA COOPER</b>				
<b>F 10:00 AM - 12:00 PM SC-145</b>				
<b>REQUIRED TEXT: Scientific Integrity – Text and Cases in Responsible Conduct of Research, 3rd Edition</b>				
<b>ISBN: 1-55581-318-6</b>				
F. L. Macrina ASM Press, 2005.				
Major advances in biotechnology and biomedical knowledge, the limited funding available for biomedical research as well as the restructuring of traditional academic institutions has shaped the contemporary biomedical research environment. Ethical and legal concerns centering on scientific misconduct, including plagiarism, grant writing and data handling as well as the use of animals, human subjects and biohazards will be addressed in both lecture format and through various workshops. Upon completion of this course students are expected to be able to 1) examine attitudes toward ethical problems in biomedical research and education, and 2) have the ability through an awareness of the technical and ethical aspects of decision making, to critically reflect on current ethical issues in biomedicine. Assigned readings relevant to these issues will be made prior to the class meeting. This course requires substantial student participation in class. It is a letter-graded course.				

**MBIO 5055**                      **TOPICS IN CELL AND MOLECULAR BIOLOGY**                      **FALL/SPRING**                      **2 Credits**                      **REQUIRED COURSE**

**COURSE DIRECTOR: GSBS FACULTY**

**W 2:00-4:00 PM SC-145 FALL – Molecular Biology faculty**

**M 2:00-4:00 PM SC-145 SPRING – Cell Biology faculty**

This course is designed to give students experience in speaking in front of an audience of scientific peers as well as scientific writing. Given the objective of realistic speaking, each student will give at least one formal seminar to the members of the department. Formal didactic sessions will include an introduction to seminar preparation and student presentations in journal club format. Student presentations will be based upon scientific papers selected by the student based on topics provided by the faculty. Each semester's seminars will focus upon a different area of research depending on the professor who is teaching the course.

**MBIO 520 A-D**                      **LABORATORY ROTATION**                      **FALL/SPRING**                      **1 Credit**                      **REQUIRED COURSE**

**COURSE DIRECTOR: GSBS FACULTY**

**PREREQ: PERMISSION BY FACULTY/INVESTIGATOR**

Laboratory rotations are essential components of a student's education in both the Cell Biology and Molecular Biology tracks. These experiences introduce students to specific areas of cell and molecular biology; expose students to specialized techniques, and familiarize students with specific projects in the program in anticipation of choosing a research advisor. Students will be evaluated on their attendance, motivation and interest within the lab as well as their attendance and participation at lab meetings. Students are responsible for learning new techniques, asking questions and working semi-independently by the end of each lab rotation. Students are encouraged to select their laboratory rotations so as to acquire diverse research experiences. Three laboratory rotations must be completed prior to the selection of a thesis advisor. During the first two weeks of the fall semester, the student will provide the Program Coordinator with the names of two faculty members, who have agreed to sponsor the student for lab rotation in the Fall. Each lab rotation will consist of 7 weeks with two in the fall and one in the spring semester; if a fourth is necessary, it can be completed within the spring semester. Hence, by the middle or end of the spring semester, the student will know which lab they will do their research in for their thesis.

**MBIO 5511**                      **RESEARCH IN CELL AND MOLECULAR BIOLOGY**                      **FALL/SPRING**                      **5 Credits**                      **REQUIRED COURSE**

**COURSE DIRECTOR: DOCTORAL STUDENT'S MENTOR**

Each course will be directed by a doctoral student's Mentor who is a member of the Cell or Molecular Biology Department and its content will reflect his/her research interests. The goal is to have the student gain experience in a research laboratory and gain insight into the creative research process.

**MBIO 5600**                      **WORK IN PROGRESS-CELL BIOLOGY**                      **FALL/SPRING**                      **1 Credit**                      **REQUIRED COURSE**

**COURSE DIRECTOR: DOCTORAL STUDENT'S MENTOR**

This course is for students who are official Ph.D. candidates, i.e. they have passed the Ph.D. Qualifying Exam. In either the Fall or Spring semester, both an oral seminar presentation of the student's research progress within the Department Seminar Series (MBIO 5050) and the Semi-Annual Report on Thesis Progress are required. It is the student's responsibility to inform their Thesis Advisory Committee (TAC) AND the Program Coordinator by email when their seminar is scheduled. The Mentor or Mentor-of-Record of the TAC is responsible for grading this Satisfactory/Unsatisfactory course. In the other semester within an academic year, only the Semi-Annual Report on Thesis Progress, which includes a one-page update of research progress is required, given to the student's Mentor for commenting then passed to the TAC for approval. The Mentor or Mentor-of-Record is responsible for grading this Satisfactory/Unsatisfactory course.

**MBIO 5500**                      **WORK IN PROGRESS-MOLECULAR BIOLOGY**                      **FALL/SPRING**                      **1 Credit**                      **REQUIRED COURSE**

**COURSE DIRECTOR: DOCTORAL STUDENT'S MENTOR**

This course is for students who are official Ph.D. candidates, i.e. they have passed the Ph.D. Qualifying Exam. In either the Fall or Spring semester, both an oral seminar presentation of the student's research progress within the Department Seminar Series (MBIO 5050) and the Semi-Annual Report on Thesis Progress are required. It is the student's responsibility to inform their Thesis Advisory Committee (TAC) AND the Program Coordinator by email when their seminar is scheduled. The Mentor or Mentor-

of-Record of the TAC is responsible for grading this Satisfactory/Unsatisfactory course. In the other semester within an academic year, only the Semi-Annual Report on Thesis Progress, which includes a one-page update of research progress is required, given to the student's Mentor for commenting then passed to the TAC for approval. The Mentor or Mentor-of-Record is responsible for grading this Satisfactory/Unsatisfactory course.

**MBIO 5050                      DEPARTMENT SEMINAR SERIES                      FALL/SPRING                      1 Credit                      REQUIRED COURSE**  
**COURSE DIRECTOR: PROGRAM DIRECTOR FOR CELL BIOLOGY**  
**DEPARTMENT AND MOLECULAR BIOLOGY DEPARTMENT**

This course is intended to enhance students' skills in interpreting scientific presentations, and communication with scientists who may be working in areas other than their own immediate research interests. Presentations for which the student's attendance is expected include visits by outside seminar speakers, as well as in house speakers that include faculty, graduate student and post doctoral presentations. A sign up sheet will be available at the front of the seminar room and students should sign up after each session. Attendance of 70% is required for a satisfactory grade. If students are unable to attend a presentation for any reason, they should contact Ms. Claire Holloway at 566-6757 or email at [hollowcl@umdnj.edu](mailto:hollowcl@umdnj.edu) to indicate their unavailability for that particular session, and their reason for it.

When speakers are from outside the Institution two student ambassadors will be appointed (one primary, senior student and one secondary, junior student). The senior ambassador will generate a biographical sketch and/or an abstract of the research interests of the guest lecturer, and will provide this information to Ms. Holloway for distribution to all other students, faculty, and staff. Invited lecturers may be asked to have lunch with the doctoral students, during which time the ambassadors will serve as student host, facilitating discussion and interaction. Ambassadors should work together to ensure that at least six students attend the luncheon and will notify Ms. Holloway as to which students can be expected. Ms. Holloway will also provide to the student ambassadors a copy of the schedule for the faculty member indicating which office and at what times the visitor should be conducted following the student luncheon. A student administrator appointed each week will be responsible for returning the attendance sign up sheet to Ms. Holloway/UDP2200.

This is a Satisfactory/Unsatisfactory graded course. Other students who elect to take this course MUST be registered for Lab Rotation, Independent Study or Thesis Research in the same semester in order to be allowed to register for this course. Please check the seminar website frequently for updates on seminar additions or cancellations:

<http://www3.umdnj.edu/mobioweb/events/seminar.htm> .

**MBIO 5000                      THESIS RESEARCH/Ph.D.                      FALL/SPRING                      10 Credits                      REQUIRED COURSE**

The Mentor or Mentor-of-Record is responsible for grading this Satisfactory/Unsatisfactory graded course.

**MBIO 5008                      THESIS RESEARCH/M.S.                      FALL/SPRING                      5 Credits                      REQUIRED COURSE**

The Mentor or Mentor-of-Record is responsible for grading this Satisfactory/Unsatisfactory graded course.

**MBIO 5023                      GRADUATE GENETICS                      FALL                      2 Credits**

**COURSE DIRECTOR: DR. RONALD ELLIS**

**T 10:00 AM-12:00 PM SC-145**

**RECOMMENDED TEXT: Introduction to Genetic Analysis, 8<sup>th</sup> Edition**

**ISBN: 0-7167-4939-4**

AJF Griffiths, SR Wessler, RC Lewontin, WM Gelbart, DT Suzuki, and JH Miller  
W.H. Freeman and Company Publishing, 2005.

This course covers advanced topics in genetic analysis and genetic methods. Subjects will include Classical Genetics, Genetic Mapping, Genetic Pathways, Medical Genetics, Advanced Topics, and Model Organisms. Throughout the course, the focus is on the techniques and logic common to all research subjects, from viruses to humans. Additional material will be presented in lectures or in scientific papers.



**MBIO 510 A                      ADVANCED TOPICS IN CELL AND MOLECULAR BIOLOGY    FALL/SPRING                      3 Credits**

**COURSE DIRECTOR: GSBS FACULTY**

This course will deal with recent advances in different areas of interest depending on the expertise of the faculty member who is teaching. Topics may include but are not limited to: 1) transcriptional control, 2) translational control, 3) genetic analysis in model organisms, or 4) bioinformatics.

**MBIO 5150                      READINGS IN CELL AND MOLECULAR BIOLOGY                      FALL/SPRING                      2 Credits**

**COURSE DIRECTOR: GSBS FACULTY**

This course of independent study will focus on cutting-edge research in Cell and Molecular Biology. Recent research papers will form the basis for discussion that will be initiated by student presentations. The subject matter will vary depending upon the particular faculty members interests.

## Master of Biomedical Sciences Program: M.S. (thesis); M.B.S. (non-thesis); D.O./M.S. (thesis)

### Course Descriptions

**GSSDN 5001**                      **FUNDAMENTALS OF BIOCHEMISTRY AND MOLECULAR BIOLOGY (I)\***                      **FALL**                      **3 Credits**                      **CORE COURSE**

**COURSE DIRECTOR: DR. SUBHASIS BISWAS**

**TH 5:00-8:00 PM AC-279/281**

**REQUIRED TEXT: Biochemistry, 5th Edition**

**ISBN-10: 0716746840**

J.M. Berg, J.L. Tymoczko, L. Stryer.

W.H. Freeman and Company Publishing, 2002.

**REQUIRED TEXT: Genes IX**

**ISBN: 9780763740634**

B. Lewin

Jones & Bartlett Pub, 2007.

This course will focus on basic and advanced topics in Biochemistry and Molecular Biology. The course is designed to give the students a solid foundation in these subject areas. It is a course for both the basic scientist who seeks general principles about cellular function, and students preparing for health-related careers who wish to apply knowledge of the mechanisms of normal cellular function to the understanding of molecular dysfunction in human disease.

**\* MEDICAL BIOCHEMISTRY can substitute for FUNDAMENTALS I**

**GSSDN 5002**                      **FUNDAMENTALS OF CELL BIOLOGY (II)**                      **FALL**                      **3 Credits**                      **CORE COURSE**

**COURSE DIRECTOR: DR. DEBORAH PODOLIN**

**W 5:00-8:00 PM AC-279/281**

**RECOMMENDED TEXT: Molecular Biology of the Cell, 4th Edition**

B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter.

Garland Publishing, 2002.

This course will focus on the biology and physiology of the cell and is organized around the central theme of homeostasis – how the cell meets changing demands while maintaining the internal constancy necessary for all cells and organs to function. It is a course for both the basic scientist who seeks general principles about cellular function, and students preparing for health-related careers who wish to apply knowledge of the mechanisms of normal cellular function to the understanding of cellular dysfunction in human disease.

**MBIO 5113**                      **FUNDAMENTALS OF SYSTEMS BIOLOGY (III)\***                      **SPRING**                      **3 Credits**                      **CORE COURSE**

**COURSE DIRECTOR: DR. KINGSLEY YIN**

**T 5:30-8:30 PM AC-279/281**

**PREREQ- FUNDAMENTALS I AND FUNDAMENTALS II**

**REQUIRED TEXT: Berne & Levy Principles of Physiology, 4<sup>th</sup> Edition**

M.N. Levy, B.M. Koeppen, and B.A. Stanton

Mosby Publishing, 2006.

This course will focus on physiological systems of the human body, namely, the cardio-renal system and endocrinology. The course will be in the form of didactic lectures. Students will be evaluated on their performance on two examinations. At first the student will firstly be introduced to basic physiological aspects of the cardiovascular system

and how it interacts with the kidney. In addition, there will be integrated lectures on diseases that may affect the heart and pharmacological treatments for these disorders. In the Endocrinology section, the student will be introduced to the actions of various hormones, which affect macro- and micronutrient metabolism. These series of lectures will provide the student with a clear understanding of three complex physiological systems. In order to consolidate understanding of these systems, lectures will be supplemented with appropriate literature outside of texts.

\* **MEDICAL PHYSIOLOGY can substitute for FUNDAMENTALS III. HOWEVER, IF A STUDENT HAS EARNED A:**

1. **“B+ OR BETTER” IN MEDICAL PHYSIOLOGY, THE STUDENT WILL NOT BE ALLOWED TO ENROLL IN FUNDAMENTALS III.**
2. **“B” IN MEDICAL PHYSIOLOGY, THEY WILL BE CONSIDERED INDIVIDUALLY FOR EXEMPTION FROM FUNDMENTALS III.**
3. **“C+ OR LOWER” IN MEDICAL PHYSIOLOGY, THEY WILL BE REQUIRED TO TAKE FUNDMENTALS III.**

**MSBS 691 A SEMINAR IN BIOMEDICAL SCIENCES FALL 2 Credits CORE COURSE**  
**COURSE DIRECTOR: DR. VENKAT VENKATARAMAN**  
**T 5:00-7:00 PM AC-279/281**

This course aims to familiarize students in biomedical research where knowledge is being created and in the integration and interpretation of the knowledge thus created. This course is designed to teach the technique of scientific discourse by providing opportunities for students to effectively communicate ideas both orally and in writing to a critical audience of faculty and peers. At the end of the course, the student will have: a) a good background of current biomedical research; b) developed the critical and creative thinking skills necessary for innovative research and evaluation research data; and c) improved written and oral communication skills.

**MBIO 5001 ETHICS IN SCIENCE, RESEARCH AND SCHOLARSHIP\* SPRING 2 Credits**  
**COURSE DIRECTOR: DR. KATRINA COOPER**  
**F 10:00 AM - 12:00 PM SC-145**

**REQUIRED TEXT: Scientific Integrity – Text and Cases in Responsible Conduct of Research, 3rd Edition**

F. L. Macrina

ASM Press, 2005.

Major advances in biotechnology and biomedical knowledge, the limited funding available for biomedical research as well as the restructuring of traditional academic institutions has shaped the contemporary biomedical research environment. Ethical and legal concerns centering on scientific misconduct, including plagiarism, grant writing and data handling as well as the use of animals, human subjects and biohazards will be addressed in both lecture format and through various workshops. Upon completion of this course students are expected to be able to 1) examine attitudes toward ethical problems in biomedical research and education, and 2) have the ability through an awareness of the technical and ethical aspects of decision making, to critically reflect on current ethical issues in biomedicine. Assigned readings relevant to these issues will be made prior to the class meeting. This course requires substantial student participation in class. It is a letter-graded course.

**\* Required course for anyone interested in doing a Masters research thesis.**

**MBIO 5017 HUMAN DIAGNOSTIC IMAGING FALL 3 Credits**  
**COURSE DIRECTOR: DR. ROCCO CARZIA**  
**W 6:00-9:00 PM AC-279/281**

**PREREQ- CLINICALLY INTEGRATED HUMAN ANATOMY (MBIO 5015) or CLINICALLY ORIENTED HUMAN ANATOMY (MBIO 5112)**

**OPTIONAL RECOMMENDED TEXT: Atlas of Human Anatomy, 4th Edition**

F.H. Netter, M.D.

Saunders, Elsevier, 2006.

**OPTIONAL RECOMMENDED TEXT: Imaging Atlas of Human Anatomy, 3rd Edition**

J.Weir and P.H. Abrahams.

Mosby Publishing, 2003.

**OPTIONAL RECOMMENDED TEXT: Clinically Oriented Anatomy, 5<sup>th</sup> Edition**

K.L. Moore and A.F. Dalley

Lippincott Williams & Wilkins Publishing, 2006.

The practice of anatomy in medicine entails the recognition of anatomical structures in images acquired through the various modalities of diagnostic imaging. Through the use of the various imaging modalities and clinical cases, students are required to apply their knowledge of clinical anatomy to diagnostic imaging and to recognize normal and abnormal anatomy in these images.

**MBIO 5111                      ADVANCES IN CELL BIOLOGY                      SPRING                      3 Credits**

**COURSE DIRECTOR: DR. VENKAT VENKATARAMAN**

**M 5:00-8:00 PM AC-279/281**

**REQUIRED TEXT: Molecular Biology of the Cell, 4th Edition**

B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter.

Garland Publishing, 2002.

This course discusses cells. Why? In the words of Albert Claude: "It is the cells which create and maintain us, during the span of our lives, our will to live and survive, to search and experiment, and to struggle. It is this cell which plans and composes all organisms, and which transmits to them its defects and potentialities".

**MBIO 5112                      CLINICALLY ORIENTED HUMAN ANATOMY                      SPRING                      6 Credits**

**COURSE DIRECTOR: DR. ROCCO CARZIA**

**W 6:00-8:00 PM, TH 6:00-9:00 PM AC-279/281,**

**F 6:00-9:00 PM Dissection Laboratory**

**REQUIRED TEXT: Clinically Oriented Anatomy, 5<sup>th</sup> Edition**

K.L. Moore and A.F. Dalley

Lippincott Williams & Wilkins Publishing, 2006.

**REQUIRED TEXT: Atlas of Human Anatomy, 4rd Edition**

F.H. Netter, M.D.

Saunders, Elsevier, 2006.

**REQUIRED TEXT: E. Grant's Dissector, 13th Edition**

P.W. Tank.

Lippincott, Williams & Wilkins Publishing, 2005.

Anatomy for the health profession requires the understanding of the spatial and functional relationships of structures and how these relationships change with disease. This 6-credit course takes a regional approach, concentrating heavily on torso and head and neck anatomy whereas limb anatomy is surveyed and integrating with back anatomy. This course, assisted with dissection, emphasizes these spatial and functional relationships for the elucidation of structures in diagnostic images and for the understanding of the anatomical basis for some disease entities.

**MBIO 5114                      PRINCIPLES OF PHARMACOLOGY                      SPRING                      3 Credits**

**COURSE DIRECTOR: DR. BERND SPUR**

**W 6:00-9:00 PM AC-AUDITORIUM**

**REQUIRED TEXT: Basic and Clinical Pharmacology, 9th Edition**

B.G. Katzung

McGraw-Hill Publishing, 2004.

The modern discipline of pharmacology involves understanding how medications are used in the prevention, diagnosis and treatment of human diseases. The emphasis of

this course is on mechanisms of drug action, therapeutic applications, adverse effects, contraindications and drug interactions. The overall mission of the course will be to introduce students to the basic principles of pharmacology and to familiarize them with classes of drugs and examples of specific drugs used frequently in the clinical setting.

**MBIO 5301                      LABORATORY ANIMAL SCIENCE                      FALL                      3 Credits**

**COURSE DIRECTOR DR. BERTRAM LIPITZ**

**M 5:00-8:00 PM SC-145**

**REQUIRED TEXT: Laboratory Animal Medicine: Principles and Procedures**

**ISBN: 0-323-01944-7**

M. Sirois

Elsevier Mosby Publishing, 2005.

This course will fulfill the training requirements as defined by the Animal Welfare Act. The first five weeks will cover topics such as laws and regulations, the ethics of animal research, basic husbandry and animal welfare, occupational health and safety, and animal diseases with an emphasis on how they affect research. The course will also include discussions of animal model selection, including the use of transgenic and immunocompromised animals and a review of standard animal related techniques used in research such as aseptic surgery, injections, blood collection, antibody production, euthanasia and tissue harvesting. Other topics will include studying techniques for handling, anesthesia, injection sites, and blood, urine and tissues harvesting from a variety of species.

**MBIO 5435                      PATHOPHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM                      FALL                      3 Credits**

**COURSE DIRECTOR: DR. CARL HOCK**

**T 6:00-9:00 PM SC-145**

**PREREQ: FUNDAMENTALS III OR MEDICAL PHYSIOLOGY**

**REQUIRED TEXT: Pathophysiology of Heart Disease, 3<sup>rd</sup> Edition**

L.S. Lilly

Lippincott, Williams & Wilkins Publishing, 2003.

Cardiovascular disease remains the number one killer in the United States. Despite the current successes in the treatment of acute myocardial infarction, the incidence of heart failure continues to increase as the population ages. This course will explore the underlying causes of heart disease and other cardiovascular diseases with an emphasis on normal physiology, pathophysiologic changes and current controversies. The course will cover selected topics of cardiovascular disease including: common cardiac arrhythmias, ischemic heart disease, acute coronary syndromes, atherosclerosis, hypertension, diseases of the peripheral vasculature and heart failure. The purpose of this course is to examine the underlying causes and the most current thinking as it relates to cardiovascular disease. The course will involve both lecture presentation and discussion of current literature.

**MBIO 3001                      EXERCISE PHYSIOLOGY                      SPRING                      3 Credits**

**COURSE DIRECTOR: DR. DEBORAH PODOLIN**

**TH 5:00-8:00 PM AC-279/281**

**PREREQ OR COREQ: FUNDAMENTALS III OR MEDICAL PHYSIOLOGY**

**REQUIRED TEXT: Exercise Physiology, 4th Edition**

G.A. Brooks, T.D. Fahey, and K.M. Baldwin

McGraw Hill, 2005.

A major emphasis will be placed on examining the mechanisms underlying the body's response to acute and chronic exercise stress. The first portion of the course will include the fundamentals of bioenergetics and metabolism, measurement of work, power and energy expenditure, respiratory system, cardiovascular system, endocrine system, neuromuscular system, and the physiological adaptations of training. The latter part of the course will delve into selected topics in the field of exercise physiology such as obesity and weight loss, slowing age-related changes with exercise, ergogenic aids, overtraining and fatigue and gender differences in physiology and performance.

**GUNF 5001                      FUNDAMENTALS OF BIOINFORMATICS                      SPRING                      3 Credits**

**COURSE DIRECTOR: DRS. BRUCE BYRNE AND ERIC MOSS**

**W 5:00-8:00 PM AC-273**

**PREREQ- MOLECULAR BIOLOGY, BIOCHEMISTRY AND/OR ADVANCED GENETICS**

**REQUIRED TEXT: Bioinformatics for Dummies**

ISBN-10: 0470089857; ISBN-13: 978-0470089859

Jean-Michel Claverie (Paperback).

John Wiley & Sons, Inc.; 2<sup>nd</sup> edition (2007)

This is a three credit hour, practical course in the fundamentals bioinformatics as they are used by molecular and cell biologists in laboratory research. Students enrolling in this course must have a solid background in the fundamentals of molecular biology but need not have a computer science background. Most students will have completed biochemistry and/or advanced genetics courses. The course will be conducted as face-to-face classroom/computer lab sessions and asynchronous on-line modules in about equal proportion. In successfully completing the course, students will gain competencies enabling them to search for molecular sequences (DNA and Protein) with appropriate strategies, compare and manipulate those sequences, understand the sequences within the contexts of genomes, gene expression, higher-level structures, molecular interactions and pathways as well as the literature that supports these contexts.

**MBIO 5610                      INDEPENDENT STUDY IN THE BIOMEDICAL SCIENCES                      FALL/SPRING                      3 Credits**

**COURSE DIRECTORS: GSBS FACULTY**

**PREREQ: PERMISSION BY FACULTY/INVESTIGATOR**

The student and faculty member will select a topic to study. The faculty member will present the student with a selected set of papers. The student and faculty member will meet weekly to discuss the papers and monitor the progress of writing the required 20 page paper. The student will also be responsible for presenting the findings in an oral seminar. The "Letter of Agreement" must be filled out by the student and the mentor prior to starting in the course. This Letter of Agreement form can be found in the Student Handbook. The 20 page paper must be turned in to the GSBS office in order for the student to receive their grade.

**MBIO 5200                      LABORATORY ROTATION (A) - MASTERS                      FALL/SPRING                      2 Credits**

**COURSE DIRECTORS: GSBS FACULTY**

**PREREQ: PERMISSION BY FACULTY/INVESTIGATOR**

Laboratory rotations are essential components of a student's education in both the Cell Biology and Molecular Biology tracks. These experiences introduce students to specific areas of cell and molecular biology; expose students to specialized techniques, and familiarize students with specific projects in the program in anticipation of choosing a research advisor. A Masters of Biomedical Sciences Program student needs only to complete one laboratory rotation prior to the selection of a thesis advisor. The length of the one laboratory rotation is an entire semester either in the fall or the spring (15 weeks). A "Letter of Agreement" must be filled out by the student and the mentor prior to starting in the laboratory. This Letter of Agreement form can be found in the Student Handbook. Masters of Biomedical Sciences Program students are required to submit a 2-5 page report on their experiences within the lab. NORMAL LETTER GRADED COURSE. Masters students are limited to 2 lab rotations.

**MBIO 5201                      LABORATORY ROTATION (B) - MASTERS                      FALL/SPRING                      2 Credits**

**COURSE DIRECTORS: GSBS FACULTY**

**PREREQ: PERMISSION BY FACULTY/INVESTIGATOR**

Laboratory rotations are essential components of a student's education in both the Cell Biology and Molecular Biology tracks. These experiences introduce students to specific areas of cell and molecular biology; expose students to specialized techniques, and familiarize students with specific projects in the program in anticipation of choosing a research advisor. A Masters of Biomedical Sciences Program student needs only to complete one laboratory rotation prior to the selection of a thesis advisor. The length of the one laboratory rotation is an entire semester either in the fall or the spring (15 weeks). A "Letter of Agreement" must be filled out by the student and the mentor prior to

starting in the laboratory. This Letter of Agreement form can be found in the Student Handbook. Masters of Biomedical Sciences Program students are required to submit a 2-5 page report on their experiences within the lab. SATISFACTORY OR UNSATISFACTORY GRADED COURSE. Masters students are limited to 2 lab rotations.

**MBIO 5202                      LABORATORY ROTATION – D.O./M.S.                      FALL/SPRING                      1 Credit**

**COURSE DIRECTORS: GSBS FACULTY**

**PREREQ: PERMISSION BY FACULTY/INVESTIGATOR**

Laboratory rotations are essential components of a student's education in both the Cell Biology and Molecular Biology tracks. These experiences introduce students to specific areas of cell and molecular biology; expose students to specialized techniques, and familiarize students with specific projects in the program in anticipation of choosing a research advisor. A D.O./M.S. Program student needs only to complete one laboratory rotation prior to the selection of a thesis advisor. The length of the one laboratory rotation is 8 weeks in the summer after their 1<sup>st</sup> year in the D.O. program. It is performed in conjunction with the SOM Summer Research program. Therefore, the student will also receive a stipend during this time. Proposals for the SOM Summer Research program are typically required before mid-February.

**MSBS 5000                      THESIS RESEARCH/M.S.B.S.                      FALL/SPRING                      5 Credits**

The Mentor or Mentor-of-Record is responsible for grading this Satisfactory/Unsatisfactory graded course.

## Certificate in the Biomedical Sciences Program: Certificate Course Descriptions

**GSSDN 5001**                      **FUNDAMENTALS OF BIOCHEMISTRY AND**                      **FALL**                      **3 Credits**                      **CORE COURSE**  
**MOLECULAR BIOLOGY (I)**

**COURSE DIRECTOR: DR. SUBHASIS BISWAS**

**TH 5:00-8:00 PM AC-279/281**

**REQUIRED TEXT: Biochemistry, 5th Edition**

J.M. Berg, J.L. Tymoczko, L. Stryer.

W.H. Freeman and Company Publishing, 2002.

This 3-credit hour course will focus on basic and advanced topics in Biochemistry and Molecular Biology. The course is designed to give the students a solid foundation in these subject areas. It is a course for both the basic scientist who seeks general principles about cellular function, and students preparing for health-related careers who wish to apply knowledge of the mechanisms of normal cellular function to the understanding of molecular dysfunction in human disease.

**GSSDN 5002**                      **FUNDAMENTALS OF CELL BIOLOGY (II)**                      **FALL**                      **3 Credits**                      **CORE COURSE**

**COURSE DIRECTOR: DR. DEBORAH PODOLIN**

**W 5:00-8:00 PM AC-279/281**

**RECOMMENDED TEXT: Molecular Biology of the Cell, 4th Edition**

B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter.

Garland Publishing, 2002.

This 3-credit hour course will focus on the biology and physiology of the cell and is organized around the central theme of homeostasis – how the cell meets changing demands while maintaining the internal constancy necessary for all cells and organs to function. It is a course for both the basic scientist who seeks general principles about cellular function, and students preparing for health-related careers who wish to apply knowledge of the mechanisms of normal cellular function to the understanding of cellular dysfunction in human disease.

**MBIO 5113**                      **FUNDAMENTALS OF SYSTEMS BIOLOGY (III)**                      **SPRING**                      **3 Credits**                      **CORE COURSE**

**COURSE DIRECTOR: DR. KINGSLEY YIN**

**T 5:30-8:30 PM AC-279/281**

**PREREQ- FUNDAMENTALS I AND FUNDAMENTALS II**

**REQUIRED TEXT: Berne & Levy Principles of Physiology, 4<sup>th</sup> Edition**

M.N. Levy, B.M. Koeppen, and B.A. Stanton

Mosby Publishing, 2006.

This course will focus on physiological systems of the human body, namely, the cardio-renal system and endocrinology. The course will be in the form of didactic lectures. Students will be evaluated on their performance on two examinations. At first the student will firstly be introduced to basic physiological aspects of the cardiovascular system and how it interacts with the kidney. In addition, there will be integrated lectures on diseases that may affect the heart and pharmacological treatments for these disorders. In the Endocrinology section, the student will be introduced to the actions of various hormones, which affect macro- and micronutrient metabolism. These series of lectures will provide the student with a clear understanding of three complex physiological systems. In order to consolidate understanding of these systems, lectures will be supplemented with appropriate literature outside of texts.

**MSBS 691 A**                      **SEMINAR IN BIOMEDICAL SCIENCES**                      **FALL**                      **2 Credits**  
**COURSE DIRECTOR: DR. VENKAT VENKATARAMAN**

**T 5:00-7:00 PM AC-279/281**

This course aims to familiarize students in biomedical research where knowledge is being created and in the integration and interpretation of the knowledge thus created. This course is designed to teach the technique of scientific discourse by providing opportunities for students to effectively communicate ideas both orally and in writing to a critical audience of faculty and peers. At the end of the course, the student will have: a) a good background of current biomedical research; b) developed the critical and creative thinking skills necessary for innovative research and evaluation research data; and c) improved written and oral communication skills.

**MBIO 5017 HUMAN DIAGNOSTIC IMAGING**

**FALL**

**3 Credits**

**COURSE DIRECTOR: DR. ROCCO CARZIA**

**W 6:00-9:00 PM AC-279/281**

**PREREQ- CLINICALLY INTEGRATED HUMAN ANATOMY (MBIO 5015) or CLINICALLY ORIENTED HUMAN ANATOMY (MBIO 5112)**

**OPTIONAL RECOMMENDED TEXT: Atlas of Human Anatomy, 4th Edition**

F.H. Netter, M.D.

Saunders, Elsevier, 2006.

**OPTIONAL RECOMMENDED TEXT: Imaging Atlas of Human Anatomy, 3rd Edition**

J.Weir and P.H. Abrahams.

Mosby Publishing, 2003.

**OPTIONAL RECOMMENDED TEXT: Clinically Oriented Anatomy, 5<sup>th</sup> Edition**

K.L. Moore and A.F. Dalley

Lippincott Williams & Wilkins Publishing, 2006.

The practice of anatomy in medicine entails the recognition of anatomical structures in images acquired through the various modalities of diagnostic imaging. Through the use of the various imaging modalities and clinical cases, students are required to apply their knowledge of clinical anatomy to diagnostic imaging and to recognize normal and abnormal anatomy in these images.

**MBIO 5111 ADVANCES IN CELL BIOLOGY**

**SPRING**

**3 Credits**

**COURSE DIRECTOR: DR. VENKAT VENKATARAMAN**

**M 5:00-8:00 PM AC-279/281**

**REQUIRED TEXT: Molecular Biology of the Cell, 4th Edition**

B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter.

Garland Publishing, 2002.

This course discusses cells. Why? In the words of Albert Claude: "It is the cells which create and maintain us, during the span of our lives, our will to live and survive, to search and experiment, and to struggle. It is this cell which plans and composes all organisms, and which transmits to then its defects and potentialities".

**MBIO 5112 CLINICALLY ORIENTED HUMAN ANATOMY**

**SPRING**

**6 Credits**

**COURSE DIRECTOR: DR. ROCCO CARZIA**

**W 6:00-8:00 PM, TH 6:00-9:00 PM AC-279/281,**

**F 6:00-9:00 PM Dissection Laboratory**

**REQUIRED TEXT: Clinically Oriented Anatomy, 5<sup>th</sup> Edition**

K.L. Moore and A.F. Dalley

Lippincott Williams & Wilkins Publishing, 2006.

**REQUIRED TEXT: Atlas of Human Anatomy, 4rd Edition**

F.H. Netter, M.D.

Saunders, Elsevier, 2006.

**REQUIRED TEXT: E. Grant's Dissector, 13th Edition**

P.W. Tank.

Lippincott, Williams & Wilkins Publishing, 2005.

Anatomy for the health profession requires the understanding of the spatial and functional relationships of structures and how these relationships change with disease. This 6-credit course takes a regional approach, concentrating heavily on torso and head and neck anatomy whereas limb anatomy is surveyed and integrating with back anatomy. This course, assisted with dissection, emphasizes these spatial and functional relationships for the elucidation of structures in diagnostic images and for the understanding of the anatomical basis for some disease entities.

**MBIO 5114 PRINCIPLES OF PHARMACOLOGY**

**SPRING**

**3 Credits**

**COURSE DIRECTOR: DR. BERND SPUR**

**W 6:00-9:00 PM AC-AUDITORIUM**

**REQUIRED TEXT: Basic and Clinical Pharmacology, 9th Edition**

B.G. Katsung

McGraw-Hill Publishing, 2004.

The modern discipline of pharmacology involves understanding how medications are used in the prevention, diagnosis and treatment of human diseases. The emphasis of this course is on mechanisms of drug action, therapeutic applications, adverse effects, contraindications and drug interactions. The overall mission of the course will be to introduce students to the basic principles of pharmacology and to familiarize them with classes of drugs and examples of specific drugs used frequently in the clinical setting.

**MBIO 5301 LABORATORY ANIMAL SCIENCE**

**FALL**

**3 Credits**

**COURSE DIRECTOR DR. BERTRAM LIPITZ**

**M 5:00-8:00 PM SC-145**

**REQUIRED TEXT: Laboratory Animal Medicine: Principles and Procedures**

M. Sirois

Elsevier Mosby Publishing, 2005.

This course will fulfill the training requirements as defined by the Animal Welfare Act. The first five weeks will cover topics such as laws and regulations, the ethics of animal research, basic husbandry and animal welfare, occupational health and safety, and animal diseases with an emphasis on how they affect research. The course will also include discussions of animal model selection, including the use of transgenic and immunocompromised animals and a review of standard animal related techniques used in research such as aseptic surgery, injections, blood collection, antibody production, euthanasia and tissue harvesting. Other topics will include studying techniques for handling, anesthesia, injection sites, and blood, urine and tissues harvesting from a variety of species.

**MBIO 5435 PATHOPHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM FALL**

**3 Credits**

**COURSE DIRECTOR: DR. CARL HOCK**

**T 6:00-9:00 PM SC-145**

**PREREQ: FUNDAMENTALS III OR MEDICAL PHYSIOLOGY**

**REQUIRED TEXT: Pathophysiology of Heart Disease, 3<sup>rd</sup> Edition**

L.S. Lilly

Lippincott, Williams & Wilkins Publishing, 2003.

Cardiovascular disease remains the number one killer in the United States. Despite the current successes in the treatment of acute myocardial infarction, the incidence of heart failure continues to increase as the population ages. This course will explore the underlying causes of heart disease and other cardiovascular diseases with an emphasis on normal physiology, pathophysiologic changes and current controversies. The course will cover selected topics of cardiovascular disease including: common cardiac



## UMDNJ-School of Osteopathic Medicine: First Year D.O. Courses

### Course Descriptions

**MBIO 5010                      MEDICAL BIOCHEMISTRY\*                      FALL                      6 Credits**  
**COURSE DIRECTORS: DR. KAI MON LEE**

See SOM schedule for day, time and location of course.

**RECOMMENDED TEXT:**

**Marks' Basic Medical Biochemistry: A Clinical Approach**

Michael Lieberman, Allan Marks, Colleen Smith

Lippincott Williams & Wilkins, 2006

The course goal is to provide students with a broad and thorough understanding at the molecular level of the metabolic and regulatory events that control the functioning of normal cells, tissues and organs and understand how these processes are altered by disease. It also provides the basic knowledge necessary for their future development in the medical profession.

**\* School of Osteopathic Medicine Course**

**MBIO 5011                      HISTOLOGY\*                      FALL                      4 Credits**  
**COURSE DIRECTOR: DR. JENNIFER FISCHER**

See SOM schedule for day, time and location of course.

**REQUIRED TEXTS:**

**Histology A Text and Atlas**

Ross, M.H., & Pawlina, W.

5th ed., 2006

Lippincott Williams & Wilkins

**Color Atlas of Histology**

Gartner, L.P. & Hiatt, J.L.

4<sup>th</sup> ed., 2006

Lippincott Williams & Wilkins

Histology is the detailed study of healthy cells, tissues and organs. The course content and laboratories are designed for students to learn microscopic anatomy at the level of the light and electron microscope. Emphasis is placed on the structural basis for physiologic function and the cooperative interactions among cells and their products within various tissues. Students study the architecture of the basic tissues and learn how these tissues work together to function as organ systems. Learning objectives include the ability to identify cell, tissue and organ types by their microscopic morphology and also how aberrancies in structure result in pathological states.

**\*School of Osteopathic Medicine Course**

**MBIO 5012                      MEDICAL PHYSIOLOGY\*                      FALL                      6 Credits**  
**COURSE DIRECTORS: DR. KINGSLEY YIN & DR. CARL HOCK**

See SOM schedule for day, time and location of course.

**REQUIRED TEXTS:**

**Cardiovascular Physiology**

Robert Berne and Matthew Levy,

C.V. Mosby-Year Book Company,

St. Louis, Seventh Edition, 1997.

## Physiology

Linda Costanzo,  
W.B. Saunders Company,  
Philadelphia, PA 1997.

Much of the physiology deals with an analysis, largely in terms of the chemistry and physics of what happens and where. To some extent, this analysis necessitates an examination of physiological processes at the cellular level. To another extent, physiological analysis deals with the coordination of the individual parts of the organism to form an efficiently functional whole. This aspect of physiology is generally considered under such headings as organization, regulation or integration. Whether physiological analysis is at the cellular or organismic level, such analysis is considerably more than a cataloging and recitation of events. Rather, modern physiology entails an understanding of the mechanisms underlying a particular response. What do we mean by this? When we observe a physiological response, two very different questions are elicited. The first is "how" and the second is "why". The first is a physiological question; it means "What are the mechanisms responsible for the change; what is the sequence of events between the stimulus and the response?" The second question is more teleological; it is an appeal to the idea of purpose. However, the question can be rephrased to ask: "In what way does the response help preserve the integrity and efficiency of the organism?" Both are reasonable questions and much of this course is devoted to developing the answers to them. This course is designed to provide students with a factual background and basic working knowledge of mammalian physiology with an emphasis toward human physiology. Our goal is to provide the students with the foundation and tools the primary care physician needs to understand and analyze physiological processes which underlie both health and disease. We hope that the students acquire the analytical capability for continuing self-education into the pathophysiological basis of disease.

### \*School of Osteopathic Medicine Course

\* **MEDICAL PHYSIOLOGY** can substitute for **FUNDAMENTALS III**. HOWEVER, IF A STUDENT HAS EARNED A:

1. "B+ OR BETTER" IN MEDICAL PHYSIOLOGY, THE STUDENT WILL NOT BE ALLOWED TO ENROLL IN FUNDAMENTALS III.
2. "B" IN MEDICAL PHYSIOLOGY, THEY WILL BE CONSIDERED INDIVIDUALLY FOR EXEMPTION FROM FUNDAMENTALS III.
3. "C+ OR LOWER" IN MEDICAL PHYSIOLOGY, THEY WILL BE REQUIRED TO TAKE FUNDAMENTALS III.

**MBIO 5013**

**HUMAN GENETICS\***

**FALL**

**2 Credits**

**COURSE DIRECTOR: DR. MICHAEL McCORMACK**

**See SOM schedule for day, time and location of course.**

Human Genetics involves the study of inherited human traits and diseases which must be understood by the primary care physician. The course reviews the impact of alteration of human chromosome structure and its impact on chromosome function and the human phenotype. There is extensive review of the genetic mechanisms involved in inborn errors of metabolism, as well as effects of gene mutations on the molecular basis of human genetic diseases of children and adults. The application of knowledge, techniques, and research discoveries to clinical medicine are stressed in topics such as antenatal diagnosis, newborn and heterozygote screening and genetic counseling, gene therapy, and genetic epidemiology. Clinical correlations focus on human cancers, neuropsychiatric disorders, congenital malformations, and teratogenic syndromes. Course topics are presented in a lecture format and several clinical correlations are included. Additional course information is presented in the course syllabus and textbook. Students develop an understanding of: the process of obtaining and analyzing a family history / pedigree for inherited traits and diseases and birth defects; the chromosomal basis for inheritance; and the relationship of chromosomal structure to function and of the process of mutation at the molecular, biochemical, and phenotypic levels. They study the application of human genetic technology to modern-day medicine and learn to appreciate the impact of human genetic diseases on families and populations.

**\* School of Osteopathic Medicine Course**

**MBIO 5014**

**MEDICAL MICROBIOLOGY\***

**SPRING**

**5 Credits**

**COURSE DIRECTOR: DR. SUSAN MULLER-WEEKS**

**See SOM schedule for day, time and location of course.**

**REQUIRED TEXT:**

**Lippincott's Illustrated Reviews: Microbiology**

Richard A. Harvey, Pamela C. Champe and Bruce D. Fisher

2nd ed., 2006

Lippincott Williams & Wilkins

Microbiology is designed to present an integrated concept of the interaction between microorganisms and humans. Included are the principles of virus interaction with the cell, bacterial infection, immune defense against infecting organisms, anti-infective chemotherapy, and mechanisms of antimicrobial resistance. This course includes a survey of the medically important bacteria, fungi and parasites and their associated diseases. A laboratory section provides experience with important clinical techniques of immunology and bacteriology. The course provides the student with basic information needed by the primary care physician to understand the mechanisms of virus and bacterial propagation as it relates to human disease.

**\* School of Osteopathic Medicine Course**

**MBIO 5015**

**GROSS ANATOMY\***

**SPRING**

**7 Credits**

**COURSE DIRECTOR: DR. ROCCO CARZIA**

**See SOM schedule for day, time and location of course.**

This course focuses on the study of the macroscopic structure and the 3-dimensional relationship of structures of the human body through dissection, diagnostic imaging and other methods. In addition, the anatomical basis for certain body functions are taught. However, the main objectives of this course are the immediate application of the information to the recognition of structures in diagnostic images, and to the diagnosis of adult and pediatric clinical entities having a strong anatomical basis. In other words, this course can be thought to be an “anatomical medicine” course. Indeed, students must develop competencies in normal and abnormal diagnostic imaging, recognition of structures in dissection, and recognition of relevant adult and pediatric clinical problems. In addition to clinically integrated presentations, there are sectional short and long clinical cases stressing diagnostic imaging and the processes of physical examination and diagnosis.

**\* School of Osteopathic Medicine Course**

**MBIO 5016**

**NEUROSCIENCE\***

**SPRING**

**4 Credits**

**COURSE DIRECTORS: DR. JAMES WHITE**

**See SOM schedule for day, time and location of course.**

The organization of this course is designed to deal effectively with a complex subject. The course will study the brain in three different ways: on a regional, functional and clinical basis. The redundancy is intentional and serves to emphasize the most relevant aspects of Neuroscience. In the laboratory portion of the course, wet brain dissections will cover the gross surface and internal anatomy of the brain. During the beginning of the course, lectures and slide shows will emphasize the regional organization of the nervous system. Following this, the themes of the course will switch to an emphasis on the functional systems of the brain and to a series of lectures on the cell biology of neurological disease. Problem-based sessions will address a variety of course topics and will cover both basic and clinical sciences. Students will be actively involved in the presentation of cases in the Problem-based sessions.

**\* School of Osteopathic Medicine Course**

## UMDNJ-School of Public Health: Masters in Public Health

### Course Descriptions

**PHCO-0504                      INTRODUCTION TO BIOSTATISTICS                      FALL                      3 Credits**

**COURSE DIRECTOR: DR. MARK FULCOMER**

**M 6:00-9:00 PM UEC, Suite 1081**

**PREREQUISITES: NO**

**REQUIRED TEXT: Electronic versions of lectures, exercises, and other materials are supplied.**

Applying statistical methods across the health, social, behavioral, natural, and physical sciences emphasizes similarities in analytic approaches taken by different disciplines. Examples with "real" data are related to some professions dealing directly with service provision (e.g., medicine, nursing, occupational therapy, physical therapy, clinical psychology, public health, social work, speech pathology and audiology) as well as to others frequently performing research or ancillary roles in health-care (e.g., biology, business, demography, geography). Reviews some research design, measurement, and other considerations in studying health-related issues.

**This course is taught by the School of Public Health (SPH).**

**HSAP 0652                      PRINCIPLES OF HEALTH CARE MANAGEMENT                      FALL                      3 Credits**

**COURSE DIRECTOR: DR. TERRY KONN**

**T 6:00-8:40 PM UEC, Suite 1081**

**PREREQUISITES: NO**

**REQUIRED TEXT:**

This course provides a broad overview of management in health care organizations. A key assumption in this course is that in order to truly comprehend health care management, it is important to understand organizational reality at different levels. Knowledge at the micro-level, focusing on day-to-day activities in various health care organizations, needs to be supplemented with macro-level perspectives focusing on systems and institutions where health policy is shaped and formulated. This course, thus, tries to strike a balance between micro- and macro-level perspectives on health care management. Students are expected to be active participants in their learning and make informed and thoughtful contributions to class discussions. At the end of the semester, students will have: 1) A good understanding of historical context and key contemporary forces shaping the US health care system; 2) A good understanding of various structural influences on access, equity, and quality of care; and 3) A good understanding of organizational and management theories and an ability to use these to analyze key health policy and management issues.

**This course is taught by the School of Public Health (SPH).**

**PHCO-0502J                      INTRODUCTION TO EPIDEMIOLOGY                      SPRING                      3 Credits**

**COURSE DIRECTOR: DR. PATTY VITALE**

**T 6:00-8:40 PM UEC, Suite 1081**

**PREREQUISITES: NO**

**REQUIRED TEXT: Epidemiology, Updated Edition, 3<sup>rd</sup> Edition**

**L. Gordis**

**W.B. Saunders Company, 2005.**

Principles and Methods of Epidemiology: This course introduces students to the study of disease and ill health through their patterns of occurrence in human populations. The approaches of epidemiology in estimating the burden of disease, in making inferences about cause of disease, and in evaluating primary, secondary and tertiary prevention strategies are presented.

**This course is taught by the School of Public Health (SPH).**

**PHCO-0503J                    INTRODUCTION TO ENVIRONMENTAL HEALTH                    SPRING                    3 Credits**

**COURSE DIRECTOR: DR. ROY MEYERS**

**Th 6:00-8:40 PM UEC, Suite 1081**

**PREREQUISITES: NO**

**REQUIRED TEXT: Basic Environmental Health**

**A. Yassi, T. Kjellstrom, T. de Kok, T. Guidotti**

**Oxford University Press, 2001.**

**ISBN-13: 978-0-19-513558-9**

This course explores the way in which particular characteristics of our environment impinge on health. The course examines health problems associated with chemical, physical, and biological agents, how they impact food safety, infectious disease, air quality, water quality, and land resources in community and occupational settings. Policies intended to improve public health through mitigation of environmental impacts will be reviewed.

**This course is taught by the School of Public Health (SPH).**

## Rutgers-Camden: Masters Program in Biology

### Course Descriptions

<b>56:120:508</b>	<b>CELL PHYSIOLOGY</b>	<b>SPRING</b>	<b>4 Credits</b>
<b>COURSE DIRECTOR: DR. PATRICK MCILROY</b>			
<b>LECTURE 3 HOURS; LABORATORY 3 HOURS</b>			
<b>PREREQUISITES: GENERAL PHYSIOLOGY OR BIOCHEMISTRY</b>			
Analysis of functional activities of cells, with special emphasis on problems of cell permeability, cell-environment interaction, cell excitability and conduction, and secretion.			
<b>56:120:509</b>	<b>CYTOGENETICS</b>	<b>SPRING</b>	<b>4 Credits</b>
<b>COURSE DIRECTOR: DR. DENNIS JOSLYN</b>			
<b>LECTURE 3 HOURS; LABORATORY 3 HOURS</b>			
<b>PREREQUISITE: GENETICS</b>			
Topics include chromosome structure and cell division, chromosomes in sex determination, chromosomal aberrations, induction of mutations, and chromosomes as research tools. Laboratory studies include the preparation of metaphase and anaphase chromosomes, banding and labeling procedures, and the analysis of chromosomal abnormalities.			
<b>56:120:510</b>	<b>CELL ULTRASTRUCTURE AND FUNCTION</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. ROBERT NAGELE</b>			
<b>LECTURE 2 HOURS; LABORATORY 3 HOURS</b>			
<b>PREREQ: MICROBIOLOGY, CELL BIOLOGY OR HISTOLOGY</b>			
Introduction to the methodologies employed in the study of cell organelles and their function, using selected cell types to emphasize basic methods of preparation of materials for electron-microscopical, X-ray diffraction, histochemical, and radioautographic studies.			
<b>56:120:512</b>	<b>MAMMALIAN PHYSIOLOGY</b>	<b>FALL</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. PATRICK MCILROY</b>			
<b>LECTURE 3 HOURS</b>			
<b>PREREQUISITES: GENERAL PHYSIOLOGY OR HUMAN PHYSIOLOGY</b>			
Detailed study of several areas in mammalian physiology through lecture and student presentation of selected research reports.			
<b>56:120:513</b>	<b>POPULATION GENETICS</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. DENNIS JOSLYN</b>			
<b>PREREQUISITE: GENETICS</b>			
Experimental approaches to measuring gene frequencies in animal and plant populations; changing genetic profiles in evolving populations.			
<b>56:120:515</b>	<b>HUMAN GENETICS</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>LECTURE 3 HOURS</b>			
<b>PREREQUISITES: GENETICS OR MOLECULAR BIOLOGY OR PERMISSION OF INSTRUCTOR</b>			
Principles of human heredity. Topics include genetics aspects of health and disease, birth defects, metabolic disorders, modes of inheritance, molecular and biochemical analyses, genomics and proteomics. Case studies will be discussed.			

<b>56:120:516</b>	<b>IMMUNOLOGY</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. PRADIP SARKAR</b>			
<b>PREREQUISITES: MICROBIOLOGY OR CELL BIOLOGY OR CELL PHYSIOLOGY</b>			
Immunoglobulin gene rearrangements and antibody diversity; antibody structure; antibody-antigen interactions; monoclonal antibodies and immunoconjugates; immunochemistry techniques; cellular immunology; viruses of the immune system.			
<b>56:120:521</b>	<b>CELL AND TISSUE CULTURE</b>	<b>FALL</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. HSIN-YI LEE</b>			
<b>LECTURE 3 HOURS</b>			
<b>PREREQUISITES: CELL BIOLOGY</b>			
Principles and techniques of cell and tissue culture; review of classical experiments on growth, differentiation, metabolism, and interactions of cells and other components of developing systems.			
<b>56:120:523</b>	<b>TOPICS IN QUANTITATIVE BIOLOGY</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. MARK MORGAN</b>			
<b>PREREQUISITES: PERMISSION OF INSTRUCTOR</b>			
Designed primarily for those students without much prior experience in the use of quantitative methods for the analysis and interpretation of biological data; topics include sampling, experimental design, hypothesis testing, and analysis of variance.			
<b>56:120:529</b>	<b>MOLECULAR GENETICS OF MICRO-ORGANISMS</b>	<b>SPRING</b>	<b>4 Credits</b>
<b>COURSE DIRECTOR: DR. DENNIS JOSLYN</b>			
<b>LECTURE 3 HOURS; LABORATORY 3 HOURS</b>			
<b>PREREQUISITE: PERMISSION OF INSTRUCTOR</b>			
Surveys the genetics of bacteria, bacteriophages, and lower eucaryotes. Topics include general features of the genetic code, phage genetics, structure and replication of phage nucleic acids, extra-chromosomal genetic elements, gene transfer in bacteria, and genetic analysis in lower eucaryotes.			
<b>56:120:530</b>	<b>MOLECULAR CARCINOGENESIS</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>LECTURE 3 HOURS</b>			
<b>PREREQUISITE: GENETICS OR MOLECULAR BIOLOGY OR PERMISSION OF INSTRUCTOR</b>			
Detailed examination and discussion of the molecular mechanisms underlying the initiation, promotion, and progression of cancer. Topics include cancer genetics, signal transduction, mutagenesis, and molecular therapies.			
<b>56:120:531</b>	<b>BIOLOGY OF PARASITIC PROTOZOA</b>	<b>FALL</b>	<b>2 Credits</b>
<b>PREREQUISITE: INVERTEBRATE ZOOLOGY OR PARASITOLOGY</b>			
Examination of the morphology, cell biology, and life history of various parasitic protozoans of humans and other animals. Topics include immune mechanisms, control measures, pathology, and the social and economic impacts of infection.			
<b>56:120:532</b>	<b>BIOLOGY OF PARASITIC WORMS</b>	<b>SPRING</b>	<b>2 Credits</b>
<b>PREREQUISITE: INVERTEBRATE ZOOLOGY OR PARASITOLOGY</b>			
Survey of the parasitic worms infecting humans and other animals. Emphasis placed on the transmission and reproductive strategies of the parasites, immune mechanisms, pathologic consequences, behavioral and other changes in the host, and the social and economic impacts of parasites.			

<b>56:120:534</b>	<b>ADVANCED CELL AND DEVELOPMENTAL BIOLOGY</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. HSIN-YI LEE</b>			
<b>PREREQUISITE: CELL BIOLOGY AND EMBRYOLOGY</b>			
In-depth discussion of selected topics in cell and developmental biology. Topics include gene regulation in development, cell reproductions, cell differentiation, neoplastic transformation, cell interaction, morphogenesis, pattern formation, and cell aging and senescence.			
<b>56:120:536</b>	<b>BIOLOGICAL BASIS OF BEHAVIOR</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. WILLIAM SAIDEL</b>			
<b>LECTURE 3 HOURS</b>			
<b>PREREQUISITES: NEUROBIOLOGY AND ENDOCRINOLOGY</b>			
BBB will investigate and detail the neural and/or endocrinological mechanisms of numerous specific behaviors. The focus will primarily be on vertebrate behaviors with possible forays into specific invertebrate behaviors to investigate certain motor concepts.			
<b>56:120:540</b>	<b>NEUROSCIENCE</b>	<b>FALL</b>	<b>4 Credits</b>
<b>COURSE DIRECTOR: DR. JOSEPH MARTIN</b>			
<b>LECTURE 3 HOURS; LABORATORY 3 HOURS</b>			
<b>PREREQUISITE: 56:742:510 OR PERMISSION OF THE INSTRUCTOR</b>			
Advanced study of the human nervous system; its role in normal motor function. Influence of neurophysiology, embryology and histology in normal and abnormal development explored. Response of the nervous system to disease and trauma assessed. (This course is offered in conjunction with the Masters in Physical Therapy program, so registration is strictly limited. Please contact Dr. Martin.)			
<b>56:120:555-556</b>	<b>NEUROBIOLOGY I and II</b>	<b>FALL/SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. WILLIAM SAIDEL</b>			
<b>PREREQUISITE: GENERAL PHYSIOLOGY OR CELL BIOLOGY</b>			
Study of the structure and function of nervous systems, including membrane properties of electrically excitable cells, mechanisms of synaptic transmission between neurons, and the neuroanatomical and functional organization of the mammalian brain.			
<b>56:120:560</b>	<b>ENDOCRINOLOGY</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>PREREQUISITE: CELL OR SYSTEMS PHYSIOLOGY</b>			
Endocrinology and neuroendocrinology. The structure and function of the endocrine glands, including the hypothalamus, and the biosynthesis and mechanisms of action of hormones.			
<b>56:120:575</b>	<b>NEUROCHEMISTRY</b>	<b>FALL</b>	<b>3 Credits</b>
<b>COURSE DIRECTORS: DR. THOMAS BELL</b>			
<b>LECTURE 3 HOURS</b>			
<b>PREREQUISITE: GENERAL PHYSIOLOGY OR CELL BIOLOGY</b>			
Topics include properties of membranes, myelination, axonal transport, analysis of neurotransmitter receptor binding, physiological effector mechanisms of receptors, and neurotransmitter synthesis and metabolism.			

<b>56:120:580</b>	<b>FUNGI IN ECOSYSTEMS</b>	<b>FALL</b>	<b>3 Credits</b>
<b>LECTURE 3 HOURS</b>			
<b>PREREQUISITE: GENERAL ECOLOGY OR PERMISSION OF INSTRUCTOR</b>			
Introduction to the complexities of ecosystem function and the role fungi play in these processes. The impact of fungi on primary production, secondary production, population and community regulation and their interaction with environmental pollutants will be discussed.			
<b>56:120:585</b>	<b>RECOMBINANT DNA TECHNOLOGY</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. DANIEL SHAIN</b>			
<b>LECTURE 3 HOURS</b>			
<b>PREREQUISITE: MOLECULAR BIOLOGY OR PERMISSION OF INSTRUCTOR</b>			
Examination of recombinant DNA technology and its utility in specific medical and industrial applications as well as its use in basic research. Topics include discussion of in vitro mutagenesis, heterologous gene expression in a variety of hosts, disease diagnosis, and gene therapies using genetic engineering, as well as the ecological / societal impacts of DNA technology.			
<b>56:120:588</b>	<b>LIFE AT EXTREMES</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>PREREQUISITE: PERMISSION OF INSTRUCTOR</b>			
Analysis of adaptations of organisms to extreme environments. Principles of evolution and biology illustrated by unusual adaptations.			
<b>56:120:590</b>	<b>POPULATION ECOLOGY</b>	<b>FALL</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. JOHN DIGHTON</b>			
<b>PREREQUISITE: ECOLOGY</b>			
Emphasis placed on terrestrial vertebrates and arthropods; focus on patterns and determinants of population dynamics, ecological variation among populations, and the processes affecting community organization and species interactions. Three or four Saturday field trips may replace lectures in those respective weeks. Computer simulations of population dynamics (not requiring computer literacy) and a term paper developed from the recent ecological literature are required.			
<b>56:120:596</b>	<b>WRITING FOR SCIENTIFIC PUBLICATION</b>	<b>FALL</b>	<b>3 Credits</b>
<b>CO-COURSE DIRECTORS: DR. DANIEL SHAIN &amp; SONIA KRUTZKE, M.A.</b>			
<b>PREREQUISITE: NO</b>			
The object of the course is to prepare you for writing your thesis (research or non-research) and for publishing a scientific manuscript. Robert A. Day, former managing editor of 9 ASM journals, observes that "Scientists, starting as graduate students . . . are measured, and become known (or remain unknown) by their publications" and that "Bad writing can and often does prevent or delay the publication of good science". <i>Writing for Scientific Publication</i> is geared toward increasing your ability to evaluate and improve your writing, and also to better manage the thesis and publishing process. The course will be co-instructed by Sonia Krutzke (who has taught Scientific and Technical Writing multiple times for the English Department) and myself. The course will close at 12 students.			
<b>56:120:597</b>	<b>SPECIAL TOPICS: MOLECULAR BIOLOGY (FUNDAMENTALS OF BIOINFORMATICS)</b>	<b>SPRING</b>	<b>3 Credits</b>
<b>COURSE DIRECTOR: DR. BRUCE BYRNE</b>			
<b>PREREQUISITE: MOLECULAR BIOLOGY</b>			
Bioinformatics is a rapidly evolving discipline rooted in the natural sciences (biology and chemistry) depending heavily on tools developed in collaboration with computer scientists, statisticians, and engineers. The principal audience for <i>Fundamentals of Bioinformatics</i> includes individuals who need to use the tools of bioinformatics to analyze their data, test hypotheses, and prepare themselves for working with sequence and structural analyses in integrated informatics environments.			

*Fundamentals of Bioinformatics* will be lead by biologist Dr. Bruce Byrne, and include units lead by computer scientists, computational chemists, and system biologists. Most weeks will include both lecture and in-class exercises. Several weeks will include only on-line tutorials. While the tools of bioinformatics can be directed at a number of different problems in biology, this year's offering employs examples including sequences and structures important in stem cell biology. Students enrolling in the course should have a firm background in principals of molecular biology. No special background in computer science is expected.

**56:120:601,602**

**SEMINAR IN BIOLOGY**

**FALL/SPRING**

**1 Credit**

Through discussion of papers developed and presented by students, a single topic from the area of cell biology, physiology, or ecology is investigated in depth.

## Rutgers-Camden: Masters Program in Chemistry

### Course Descriptions

56:160:514                    INTRODUCTION TO MOLECULAR MODELING                    SPRING                    3 Credits

**COURSE DIRECTOR: DR. LUKE BURKE**

**LECTURE 3 HOURS**

**PREREQUISITES: PERMISSION BY INSTRUCTOR**

Introduction to the use of computer-assisted molecular modeling techniques for the study of chemical problems; lectures on theoretical principles; instruction in use of modern modeling programs; and computer projects involving solution of chemical problems.

56:160:545                    RADIOCHEMISTRY AND RADIATION CHEMISTRY                    FALL                    3 Credits

**COURSE DIRECTOR: DR. SIDNEY KATZ**

**LECTURE 3 HOURS**

**PREREQUISITES: NO**

Interactions of ionizing radiation with matter and the resulting radiation-induced chemical reactions; excitation, ionization, free radical formation and recombination; chemical consequences of nuclear reactions; and 'hot atom' chemistry.

56:160:576                    SPECIAL TOPICS: CHEMISTRY                    FALL                    3 Credits

(INTRODUCTION TO CHEMICAL TOXICOLOGY)

**COURSE DIRECTOR: DR. HARRY SALEM (Editor-in-Chief *Journal of Applied Toxicology*)**

**LECTURE 3 HOURS**

**PREREQUISITES: NO**

Distribution, cellular penetration, metabolic conversion and elimination of toxic agents as well as the fundamental laws governing the interaction of foreign chemicals with biological systems. The course focuses on applying these concepts to the understanding and prevention of mortality and morbidity resulting from exposure to toxic agents.