

**Program:** Physiology

**Course Name:** Concepts in Molecular Physiology

**Course Number:** 516

**Course Director:** Michael Autieri, Ph.D. Room 810 MRB, 2-1751, [mautieri@temple.edu](mailto:mautieri@temple.edu)

**Credits:** 2

**Semester:** Fall, every year

**Times:** Meets once weekly for 1.5 hours

**Location:** MRB 804

**Prerequisites:** All students are required to have a background in Biology

**Description:** The overall goal of this course is to introduce Physiology graduate students to the powerful tools of modern molecular biology to aid them in their own research. Topics such as gene expression, protein interactions, gene transfer, transgenic and knock-out animal models will be discussed. Information will be presented within the framework of common topics in pathophysiology such as signal transduction and cell proliferation. The approach will combine didactic presentation with relevant case studies from the scientific literature.

Course materials will be handouts provided by the instructor, the recommended Text, and supplemental research and review articles provided by the instructor. Early lectures will be more didactic in nature to provide a common, solid foundation for class participants. Later classes will be more interactive in nature. Overall, my goal is to create an informal forum; student participation in the form of questions and discussion is encouraged and expected.

**Textbook & Readings:** Essential Cell Biology, Alberts, et al., Garland Science, 2nd Edition  
In addition each instructor will provide an outline for his or her lecture.

Class attendance is expected. Student absence must be excused or will reflect on a student's grade.

Grades will be based on two exams worth 40% each, and one take-home exam, worth 20% of the final grade.

Office Hours – The Course Director is available during the normal work day hours. Other instructors are available on the same terms.

<b>Subject</b>	<b>Instructor</b>	<b>Date</b>
Basic concepts in molecular biology: Goals: describe the function and synthesis of DNA, RNA, and proteins.	Dr. Autieri	9/13/05.
Molecular tool box: Goals: understand how DNA is cloned and amplified.	Dr. Autieri	9/20/05.
How do we study gene expression? Goals: describe the different methodologies to identify mRNA expression and changes in gene expression.	Dr. Autieri	10/27/05.

How do we study protein function? Goals: describe the different methodologies to identify protein expression, phosphorylation, and interactions.	Dr. Kubo.	10/04/05.
Gene transfer technology: Goals: appreciate the different technologies available to deliver a gene into tissue in vitro and in vivo.	Dr. Autieri	10/11/05.
No class		10/18/05
Mid-term examination	Dr. Autieri	10/25/05.
Animal models for studying pathophysiology Goals: Understand the use and multiple steps involved in generating genetically modified mice.	Dr. Autieri	11/08/05.
Signal transduction Goals: understand how external signals are transmitted to the nucleus.	Dr. Autieri	11/15/05.
Receptors and G protein signaling Goals: understand Structure and function of cell membrane-associated receptors and G-protein signaling.	Dr. Kunapuli.	11/22/05
Cell cycle regulation: Goals: describe the events that occur in each phase of the cell cycle and methods used to measure cell proliferation.	Dr. Haines.	11/29/05.
Transcription factors: Goals: Describe how proteins regulate gene expression and methods to measure transcription factor activation.	Dr. Litvin.	12/06/05.
Review session	Dr. Autieri	12/13/05.
Final examination	Dr. Autieri	12/20/05