



## INTRODUCTION TO GENETICS BIOS 225

### Course Description

This course introduces the student to the basic concepts of inheritance, populations, mutations, and techniques used to assess each of these.

**Credit: 2 credits**

**Repeatable: No**

### Course Structure

The course will be presented in different formats: Lectures with PowerPoints, self-directed learning, discussions and student assignments etc.

### Competencies

This course emphasizes competencies to enhance skills essential for a future health care professional.

- Knowledge
  - **Demonstrate content knowledge and skills in foundational courses required by biomedical professionals**
  - **Demonstrate information literacy**
  - Demonstrate quantitative reasoning
  - **Demonstrate longitudinal learning through coursework**
- Critical Thinking
  - **Develop the skills of self-reflection and peer assessment to improve personal performance.**
  - **Demonstrate the ability to analyze literature and written material**
  - **Demonstrate the ability to distinguish between well-reasoned and poorly reasoned arguments**
- Communication Skills
  - **Demonstrate effective presentation skills to faculty and peers.**
  - **Demonstrate effective listening skills**
  - **Demonstrate effective written communication**

**Objectives:**

Upon completion of BIOS 225 course, the student should be able to describe:

- The structure and function of purines, pyrimidines, nucleosides and nucleotides
- The structure and functions of nucleic acids (DNA and RNA)
- The chromosome anatomy and human karyotypes
- The concepts of prokaryotic and eukaryotic DNA replication
- The concepts of prokaryotic and eukaryotic RNA transcription and post-transcriptional modifications
- The concepts of prokaryotic and eukaryotic protein translation and post-translational modifications
- The regulations of prokaryotic and eukaryotic gene expressions
- The process of genomic, chromosomal and gene mutations; and its repair mechanism
- The Mendel' hypothesis and molecular mechanisms of genetic inheritance

**Schedule:** Dates and times to be posted at the beginning of the term on the online calendar.

**Course Topics / Outline**

Activity #	Lecture Topics
Week1	Introduction of Genetics
Week 2	Structure and function of nucleotides and nucleic acids
Week 3	Structure and function of DNA and chromosomes
Week 4	Structure and function of RNA, <b>Quiz 1</b>
Week 5	Prokaryotic and Eukaryotic DNA replication
Week 6	Prokaryotic and Eukaryotic transcription and post transcriptional modifications, <b>Quiz 2</b>
Week 7	<b>Mid-Term Examination</b>
Week 8	Mid-term exam review, Protein translation and post translational modifications
Week 9	Prokaryotic and Eukaryotic gene expression
Week 10	Genomic, chromosomal and gene mutation and repair
Week 11	Mendel's hypothesis and genetic inheritance, <b>Quiz 3</b>
Week 12	<b>Molecular Techniques presentations (Assignment)</b>
Week 13	Pre Examination Review
Week 14	<b>Final Examination</b>

**Assignments:**

Students required to present the one of the molecular biology techniques and its uses in medical field. The Presentation time is 20 minutes and the students required to submit the power-point 24 hours before the presentation schedule.

## Textbooks and Reference Materials:

### Required Texts

Denise Ferrier. Lippincott's Illustrated Reviews: Biochemistry. 7<sup>th</sup> Edition. Publisher: LWW.

### Recommended Texts

Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil. Harper's Illustrated Biochemistry. 31<sup>st</sup> Edition. Publisher: McGraw-Hill Education.

**Evaluation:** Students are evaluated by three quizzes, a midterm exam, a final exam, assignments and their attendance.

### Points:

	Points*
Assignments	10%
Quizzes	25%
Mid Term	30%
Final exam	30%
Attendance	5%
Total points	100%

\*Points are approximate and may be adjusted during the term. Students will be notified of changes.

### Grade:

Percent of Points	Letter Grade
95-100%	A(h)
90-94%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
<70%	F

### Attendance:

Students are expected to attend at least 80% of all scheduled learning activities. Attendance in the class will be recorded. Students attended 80% or more will be awarded with 5% on total scoring system. Please note that absences due to illness or misadventure will be factored into the 20% of allowable absences if informed respective faculty or the Dean of Students.

### Policies:

#### Professional Demeanor

The student should be thoughtful and professional when interacting with faculty and other students. Inappropriate behavior includes the use of offensive language, gestures, or remarks with sexual overtones. Students should maintain a neat and clean appearance, and dress in attire that is generally accepted as professional.

## Honesty

Students are expected to demonstrate honesty and integrity in all aspects of their education and in their interactions with faculty, administration, physicians, patients, and fellow students. They will not cheat, plagiarize, or assist others in the commission of these acts.

## **Faculty and Office Hours:**

Dr. Miguel Miyares, Professor and Course Director

Dr. Manish Mishra, Associate Professor

Student can schedule an appointment by email to respective faculty.