

**American University of Beirut
Faculty of Arts and Sciences
Department of Biology**

**BIOL 223 (GENETICS- 4 credits)
Prerequisite: BIOL 202
Fall 2010-2011**

Instructors	Nadine Darwiche	Zakaria Kambris
email	nd03@aub.edu.lb	
Office	Biology 201	Biology 308
AUB Extension	3926	3911
Office hours	M 1:00- 2:00 pm W 2:00- 3:00 pm or by appointment	

Meeting Time

General Lectures	M-W	9:00 - 9:50 am	Bliss Hall 203
Recitations:	F	9:00 - 9:50 am	Bliss Hall 203
	F	10:00 - 10:50 am	Charles Hostler Student Center (CHSC)
	F	11:00 - 11:50 am	CHSC
Lab Lecture:	F	1:00 - 1:50 pm	CHSC

Catalog Description

BIOL 223 - Genetics Credits: 4.00, 3.3; 4 cr. Prerequisite: BIOL 202. Each semester. A course that deals with the basic principles of classical and modern genetics with emphasis on the analysis of genetic material and genetic processes at the molecular level.

General Instructional Objectives

At the completion of this course, a student will be able to:

- 1- Demonstrate mastery of classical genetics;
- 2- Understand principles of molecular genetics and genomics;
- 3- Understand genetics techniques;
- 4- Develop critical thinking skills in research;
- 5- Judge the value of genetics research;

Specific Learning Outcomes

At the completion of this course, a student will be able to:

- 1- Understand and use common proper genetic notations;
- 2- Describe important historic experiments;
- 3- Explain mechanisms of DNA replication;
- 4- Analyze pedigree and inheritance;
- 5- Describe the use of molecular genetics at the subcellular, cellular, organismal, and evolutionary levels;
- 6- Analyze consequences of mutations on gene expression and disease;
- 7- Describe the use of genomics at the structural, functional, and comparative levels;
- 8- Apply common techniques such as electrophoresis, Southern blots, recombinant DNA technology, cloning, DNA sequencing, and the polymerase chain reaction;
- 9- Analyze the potential for using these techniques in medicine, forensics, ecological, and agricultural situations;
- 10- Integrate information from many different areas of biology, chemistry, and physics based on course material;
- 11- Calculate probabilities of simple genetics systems;
- 12- Infer metabolic relationships from genetic data;
- 13- Debate ethical and social implications of genetics research.

Resources Available to Students

- Required Textbook: Russell, P. J. 2010, iGenetics: A Molecular Approach, Pearson International Third Edition, The Benjamin/Cummings Publishing Company
- Some lecture notes will be in Word format at the AUB bookstore.
- Some course material is available on AUB Moodle.
- University library resources and internet access will be required for some topic assignments.

Grading Criteria

Exam I	Saturday , 30 Oct., 9:00- 11:00 am, Nicely 500	Kambris	25%
Exam II	Saturday, 4 Dec., 9:00- 11:00 am, Nicely 500	Darwiche	25%
Final	To be announced	Darwiche & Kambris	25%
Lab		Hajjar	25%

Academic Integrity: Please refer to AUB Student Code of Conduct

<http://pnp.aub.edu.lb/general/conductcode/index.html>, and in particular section 1.1, which concerns academic misconduct including cheating, plagiarism, in-class disruption, and dishonesty. Please be aware that misconduct is vigorously prosecuted and that AUB has a zero tolerance policy.

Schedule

Topic	Lecture	Russell Chapters
Genetics: An Introduction	Darwiche	1
DNA: The Genetic Material	Kambris	2
DNA: Replication	Kambris	3
Gene Function	Kambris	4
Mendelian Genetics	Kambris	11
Chromosomal Basis of Inheritance	Kambris	12
Extensions of and Deviations from Mendelian Principles	Kambris	13
Gene Mapping in Eukaryotes	Kambris	14
Exam I Saturday, 30 October	Kambris	
Gene Expression: Transcription	Darwiche	5
Gene Expression: Translation	Darwiche	6
Regulation of Gene Expression in Eukaryotes	Darwiche	18
Variations in Chromosome Structure and Number	Darwiche	16
DNA Mutation, DNA Repair, and Transposable Elements	Darwiche	7
Exam II Saturday, 4 December	Darwiche	
Genetics of Cancer	Darwiche	20
Genomics: Mapping and Sequencing of Genomes	Darwiche	8
Human Genome Project	Darwiche	8, 9
Genomics: Functional and Comparative Genomics	Darwiche	9
Recombinant DNA Cloning Technology	Kambris	8, 9, 10
Applications of Recombinant DNA Technology	Kambris	10
DNA Microarray	Kambris	9
Final Exam To be announced	Darwiche & Kambris	

Genetics Laboratory

Week	Topic
1	Laws of Probability
2	Simple Mendelian Genetics in Humans: Pedigree Analysis
3	Tetrad Analysis in <i>Sordaria</i> (2weeks)
4	Preparation of Bacterial Genomic and Plasmid DNA
5	Dipteran Mitochondrial DNA Extraction and Amplification using PCR
6	DNA Gel Electrophoresis
7	Restriction Enzyme Digestions and RFLP Analysis of Dipteran DNA
8	Bacterial Transformation of <i>E. coli</i>
9	Bacterial Conjugation
10	Population Genetics

Instructor	Layane Hajjar
email	lh00@aub.edu.lb
Office	Biology 106A
AUB Extension	3920
Office hours	R 10-11; F 11:30-12:30 pm

Course Policies

Attendance: Students are expected to attend all classes and laboratory sessions. If you miss two lab sessions, you will be automatically dropped from the course with a W-grade as specified in the 2010-2011 AUB Catalogue.

Assignments: You are expected to submit assignments on time. Late assignments may result in a lower grade.

Exams: No make-up exams unless accompanied with a valid medical report from AUB health centers.

Withdrawal: Kindly observe the December 6 withdrawal deadline set by the Registrar's Office.