Philadelphia University
Faculty of Science
Department of Biotechnology and Genetic Engineering
Winter Semester, 2009/2010

Course Syllabus

Course Title: Human Genetics	**Course code:** 240234
Course Level: Third year	**Course prerequisite (s) and/or corequisite (s):** Basic Genetics (240231)
Lecture Time: S-T 8:10-9:00	**Credit hours:** 2

Academic Staff Specifics

Name	Rank	Office No.	Office Hours	E-mail Address
Dr. Fayez Hamam	Assistant Prof.	823 (ext. 2345)	10:00-11:00 Sun and Tue Mon & Wed 10:.00-11:15	fhamam@philadelphia.edu.jo

Course module description:

This module is advanced course in genetics it is a major requirements for the department. It is based on lectures and it focuses on the genetic basis of human diseases using interactive and analysis procedures.

Course module objectives:

Explain the hereditary basis of human genetic diseases.

* Understanding of the structure, function, and transmission of genes, the interactions both among genes and between genes and the environment, and the role of genetic factors in health and diseases
* Demonstrate the ability to apply knowledge of hereditary disorders and congenital abnormalities to formulate appropriate diagnostic evaluation and patient management plans and to communicate information regarding genetic conditions to individuals of differing educational, socioeconomic, ethnic, and cultural backgrounds

Course/module components:

Author(s)/Editor(s): Peter Sudbery
Pearson Education Limited
ISBN: second edition, 2002

Teaching methods:

- Lectures, discussion groups, tutorials, problem solving, debates, etc.
- The use of Power Point presentation, Illustration with models, educational animations, and movies.

Learning outcomes:

- **Knowledge and understanding**
  - Understanding of the structure, function, and transmission of genes, the interactions both among genes and between genes and the environment, and the role of genetic factors in health and diseases
  - Demonstrate the ability to apply knowledge of genetic disorders and congenital anomalies to create suitable diagnostic assessment and patient management plans and to communicate information regarding genetic conditions to individuals of conflicting educational, socioeconomic, ethnic, and cultural backgrounds
- **Cognitive skills (thinking and analysis).**

  The students will learn the ability to link between different problems and problem solving capabilities such as biostatistics

  The thinking skills will be developed by cheering students to conclude answers to different questions that the instructor intends to use during the presentation of the scientific material.

  The instructor intends to inspire the student's analytical thinking side via connections with general aspects in daily life or through questions, net searching, and home works.
- **Communication skills (personal and academic).**
  - Gain Teamwork skills
  - The students have the option to share open discussion and to inquire questions during the class or any other times.
  - Students have the chance to correspond with others especially professors, while probing answers for home works or through encouraging them to attend different scientific actions that are available in the department.
- **Practical and subject specific skills (Transferable Skills).**
  - Improve the ability to search using the scientific ways to get the concepts in human genetics.
  - Improve the ability to analyze different terms or phrases to its basic parts.

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**15%**
Second examination	**15%**
Final examination: 50 marks	**50%**
Reports, research projects, Quizzes, Home works.	**20%**
Total	**100%**

Course/module academic calendar:

Week	Chapter	Basic and support material to be covered homework/rep and their due	Pages
(1), (2) and (3)	1	Introduction to human genetics and human genetic diseases • Frequency and types of genetic disease • Single-gene disorders • Complexity in single-gene disorders • Autosomal recessive • Autosomal dominant • Sex-linked • Multifactorial or complex disorders • Evidence for genetic factors in common diseases • Genetic influences on personality disorders and pheno traits • Chromosomal imbalances • Mitochondrial disorders • The Human Genome Project **Quiz #1 (4%)**	1-25
(4), (5) and (6)	2	Introduction to the structure of the human genome **Amount of DNA in the human genome** • Genes • Gene expression • Gene families • Pseudogenes • Tandem repeat arrays of rRNA, tRNA and histone genes **Intermediate repeated DNA** • LINEs: L1 and retrotransposition • SINEs: *Alu* family • Processed pseudogenes • Selfish DNA **Highly repetitive DNA** • Telomeres • Tandem repeat arrays at centromeres • Minisatellites • Microsatellites • Human karyotype **Packaging DNA into chromosomes** • Nucleosomes • 30-nm fibre • 700-nm fibre **Second quiz (4%)** **First hour exam (15%)**	27-51
(7) + (8)	3	**Structure & Mapping of the human genome (HG)** • Importance of genomic maps • Sequence tagged sites • Genetic maps • Physical maps • Expression maps • Integration of genetic, physical and expression maps **Second hour exam (15%)**	52-86

(9) + (10)	4	**The IHGSC & Celera shotgun sequencing** 4.1 introduction pages 87-89 4.2 Basic technology for seq. HG pages 89-92 4.2.3 shotgun seq. pages 92-94 4.3 IHGSC pages 94-98 4.4 Celera Genomics Strategy pages 98 -100 4.5 Single nucleotide polymorphisms pages 100-101 4.8 analysis of HG pages 104-107 4.8.2 Genes pages 113-114 4.8.4 How many genes? Pages115-116 4.5 Single nucleotide polymorphisms (SNP) 4.6 Accessing the data 4.7 Model Organisms 4.8 Analysis of HG Seq. 4.8.1.2 CpG 4.8.2 GENES 4.9 Exploiting HG Sequence 4.9.1.1 Identifying DNA seq. expressed in mRNA 4.9.2 Expressing profiling 4.9.3 Detecting sequence variation **Quiz #3 (4%)**	
(11) + (12)	5	**Single gene disorders/ Complex genetic diseases** • Introduction • Cloning disease gene • Cystic fibrosis (CF) • DMD • Trinucleotide repeat expansion • Trinucleotide repeat expansion **Quiz # 4 (4%)**	140-141 141-146 147-152 152-154 154-158 164-172
(13) + (14)	6	**Identifying genes of complex diseases environmental effect** • Introduction • Evidence of genetic in complex diseases • The composition of complex diseases • Identifying genes of complex diseases • Genetic susceptibilty to Alzheimer's disease	181-182 183-184 184-194 194-206 216-220
(15)	7	**Introduction to Gene therapy & Gene ther models**	225-246
(16)		**Final Exam**	

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not go beyond 15%. Students who exceed the 15% boundary without a medical or emergency reason acceptable to and endorsed by the Dean of the relevant college/faculty shall not be permitted to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.