

السنة الثانية – الفصل الصيفي
أساسيات الوراثة والبيولوجيا الجزيئية
Principles of Genetics & Molecular Biology
(0501302)
(2 credit Hours)

Objectives:

By the end of this course the student should be able to:

1. Mention the details of the central dogma of molecular biology:
DNA→RNA→protein.
2. List the basic principles of gene expression of its regulation in different cells under normal & abnormal conditions.
3. Discuss at the different diseases from a molecular genetics point of view.
4. Describe the basic techniques in DNA recombinant technology & their medical applications.

Contents:

This course covers the main principles of molecular Biology & Medical Genetics.

* **The molecular biology** part will introduce the student the main principles including: Nucleic acid structure & function, DNA replication, RNA transcription, protein synthesis, regulation of gene expression, recombinant DNA technology & the molecular biology of cancer.

* **The medical genetics** part will deal with, the science of human biological variations as it relates to health & disease including:

Molecular Genetics: gene organization & manipulation & general approach to major classes of genetic diseases. Cytogenetics: general principles of chromosome structure & analysis & major clinical disorders associated with chromosomal abnormalities. Biochemical genetics: major metabolic pathways & associated disorders. Population genetics: quantitative genetics, population screening, risk assessment, multifactorial inheritance & some ethical consideration.

Nucleic acid structure.
DNA replication
RNA transcription
Protein synthesis
Regulation of gene expression
Recombinant DNA technology
Molecular biology of cancer
Background & history
Basic cell biology: structure & function of genes & chromosomes.
Genetic variation: its origin & detection
Autosomal dominant & recessive inheritance
Sex linked & mitochondrial inheritance
Clinical cytogenetics: the chromosomal basis of human disease
Biochemical genetics: disorders of metabolism
Developmental genetics

Prenatal diagnosis
Cancer genetics
Multifactorial inheritance & common disease
Genetic screening, genetic diagnosis & gene therapy

Tests & Evaluation:

Mid term course exam	40%
Quiz	10%
Final Exam	50%

References:

1. Molecular Biology, Robert F. Weaver, 2nd edition, McGraw Hill 2002.
2. Genes VII, Benjamin Lewin, edition 1, Oxford Univ. Press, January 2000.
3. Medical Genetics, Jorde, Carey, Bamshad, White, Mosby.
4. Elements of Medical Genetics, Muller & Young, Churchill & livingstone.