

Al-Nahrain University
College of Medicine
Department of Human Anatomy



Course Title & Code: Medical biology (ANTbio-12).

Grade: first year

Semester: second / 2023-204

Coordinator: Shatha Mahmood hasan

Total Hours: Theory (15) week 15 week Practical

Hours/week: Theory (2) Practical (3)

Credits: theory /2 practical / 1.5

1. learning objectives

The course of cytogenetics is designed to enable the student to:

- 1 Understanding the basis of genetics and medical inheritance.
2. Study the basic information about the human genome and techniques used in genetic studies of chromosomes
3. understanding how the gene expression
4. study the Genetic diseases and cancer
- 5- the course also includes some types of lower organisms and correlate them with disease

The course is designed to enable the student to

1. Medical genetics: Study in cytogenetics and medical genetics, basic information about the Human genome, the gene expression, abnormalities, chromosomes, mendelian inheritance, techniques used in genetic studies
2. The content of pathogenic lower organism lectures serves as an aid for lower organisms, those which are of interest to medical students, and Correlate the lower organisms with disease

2. Instructional and Learning methods and tools

- The syllabus is given to students in (2) hours of theoretical lectures, and (3) hours of practical sessions in the week.

- The lab sessions are given principally through lectures followed by practical application of the corresponding method. Also, study some types of lower organisms.
- The learning methods used in the lectures are power points and videos.
- The practical sessions include various subjects related to theoretical sessions.

the methods of learning used in the practical session are power points, videos, Prepared stained slides, and laboratory exercises

The theoretical lectures and the practical session involved dividing the class into four groups, about 76 students in each, two lectures/per week, and 3 hours of practical laboratory sessions/ per week.

Theory:

No.	Topics	Description and aim	Hours
1	Introduction to cytogenetics	“Cytogenetics” traditionally refers to the study of chromosomes with the use of microscopy following the application of banding techniques, permitting the identification of abnormalities of chromosome number, loss or gain of chromosomal material, or positional changes.	1
2	Patterns of Chromosome Inheritance	Students need to understand the basic laws of inheritance to appreciate how conditions are passed on in a family. An accurate family health history is a valuable tool to illustrate how conditions are passed down through generations.	1
3	Chromosomes structure	Study chromosomes are thread-like structures in which DNA is tightly packaged within the nucleus. DNA is coiled around proteins called histones, which provide the structural support	1
4	Chromosomes structure	Study chromosomes are thread-like structures in which DNA is tightly packaged within the nucleus. DNA is coiled around proteins called histones, which provide the structural support	1
5	Chromosome Inheritance abnormalities	Learn the terms used to describe the abnormalities in chromosomal numbers: polyploidy, aneuploidy: trisomy and monosomy, and mosaicism and their causing mechanisms. •	1

6	Chromosome Inheritance abnormalities	Learn the terms that describe the abnormalities in chromosomal structure: deletions, duplications, translocations, and inversions	1
7	Inheritance of Genetic Disorders	A trait or disorder that is determined by a single gene in an autosome is said to show autosomal inheritance.	1
8	Sex-Linked Inheritance	Study Sex-linked inheritance refers to the pattern of inheritance shown by genes that are located on either of the sex chromosomes	1
9	Midterm Exam Theory		1
10	Midterm Exam practical		1
11	Cell cycle regulation I	Describe the internal and external factors that influence the cell cycle control system	1
12	Cell cycle regulation II	Explain how the abnormal cell division of cancerous cells escapes normal cell cycle controls	1
13	DNA Biology(DNA	describe the structure of DNA as a polymer composed of many nucleotides joined by phosphodiester bonds forming a sugar-phosphate backbone	1
14	RNA Structure& Function	RNA molecules perform a variety of roles in the cell but are mainly involved in the process of protein synthesis (translation) and its regulation, and describe the similarities and differences between RNA and DNA	1
15	DNA Replication	Understand the basic mechanism of DNA replication, and know the various enzymes that play a role in this process.	1
16	Gene Expression I	This lesson describes the steps involved in a cell as DNA sequence information is read to make RNA and RNA is read to make proteins. A gene will only control a trait in an organism when the gene is expressed	1
17	Gene Expression II	Describe the basic mechanics of translation, including the roles of ribosomes, tRNAs, and amino acids.	1
18	Mitochondrial DNA	Mitochondria are unique organelles carrying their genetic material, independent from that in	1

		the nucleus.	
19	Mitochondrial diseases	Describe the etiology, pathogenesis, and clinical features of one type of mitochondrial disease	1
20	Cancer (Overview of cancer)	Describe in general terms how cancers develop and be able to describe the hallmarks of cancer. Describe the important genetic/familial syndromes related to cancer development, identify their mode of inheritance and impact on cancer development	1
21	Causes and Prevention of Cancer	Identify common environmental hazards that can cause cancer (i.e. chemical, biological, physical, radiation). 2. Identify common diseases and biological characteristics that can predispose a person to developing cancer	1
22	Diagnosis of Cancer	Goal: By graduation, medical students should know common presentations of cancer and how to make a diagnosis of cancer	1
23	Stem cells I	In this lesson, students will be able to state where stem cells are found, describe the function of stem cells in the human	1
24	Stem cells II	Study the potential benefits and risks of using stem cells in medicine	1
25	Protozoa II	Study protozoa to provide students with knowledge concerning biological, epidemiological and ecological aspects of parasites causing diseases in humans. · To enable students to understand the pathogenesis, clinical presentations and complications of parasitic diseases	1
26	Platyhelminthes II		1
27	Overview		1

28	Overview		1
Total			

Practical:

No.	Topics	Hours
1	Human inherited characteristic analysis	
2	Micro techniques(blood group typing)	3
3	Study types and shapes of chromosomes(karyotype)	3
4	Clinical features of certain chromosomal abnormalities	3
5	Inheritance related to sex	3
6	Midterm exam	3
7	Method of DNA Extraction	3
8	Features of cancer cells	3
9	Site of stem cells in the body	3
10	Protozoa II	3
11	Platyhelminthes II	3
12	Overview	3
13	Overview	3

Student assessment:

The minimum requirement for a student to pass is to achieve at least 50% of the total 100 marks assigned for the course.

The marks are distributed as follows:

Mid-term Theory	Mid-term Practical	Quiz	total
15%	10%	5%	30%
Final Practical	Final Theory		total
20%	50%		70%

Students who fail the cut-off mark mustard are required to re-sit for a second trial examination similar to the final one.

Books and references:

1-Molecular biology of the cell, Bruce Albert.2002

2-Elements of Medical genetics, Alan E, H. Emery, sixth edition, London 1983

3-EMERY'S Elements of Medical Genetics.

Peter D. Turnpenny, Sian Ellard,14th EDITION