Module (Course Syllabus) Catalogue

2022-2023

College/ Institute	**Erbil Technical Health and Medical College**	
Department	**Medical Laboratory Technology**	
Module Name	**Human Genetics**	
Module Code		
Degree	**Technical Diploma** ☐ **Bachelor** ■ **High Diploma** ☐ **Master** ☐ **PhD** ☐	
Semester	**6th**	
Qualification	**Bachelor**	
Scientific Title	**Lecturer**	
ECTS (Credits)	**6**	
Module type	**Prerequisite** ☐ **Core** ■ **Assist.** ☐	
Weekly hours	**4**	
Weekly hours (Theory)	**(2)hr Class**	**(70)Total hrs Workload**
Weekly hours (Practical)	**(2)hr Class**	**(70)Total hrs Workload**
Number of Weeks	**14**	
Lecturer (Theory)	**Dr. Nzar Ali Ameen Shwan**	
E-Mail & Mobile NO.	**nzar.shwan@epu.edu.iq**	
Lecturer (Practical)		
E-Mail & Mobile NO.	**07508944872**	
Websites		

Course Book

Course Description	This course provides students with an understanding the human body anatomy and basic physical and chemical principles that underline physiological processes. Several biological systems are considered, including respiratory, circulatory, digestive and metabolic, thermoregulatory, osmosis regulatory, renal, nervous, musculoskeletal, neural, hormonal, and sensory. The weekly laboratory session will complement the lecture, mainly by providing hands-on experience in observation, data collection, measurement, and problem-solving skills
Course objectives	Upon successful completion of this course, students should be able to demonstrate the following competencies: • An understanding of the central theories and methodologies that define the field of genetics and its various subdisciplines (traditional, molecular, and population genetics) and the ability to use the vocabulary that embodies this knowledge. • To describe and apply the principles of Mendelian genetics. a. Explain Mendel's Principles of Segregation and Independent Assortment b. Describe the chromosomal basis of inheritance c. Explain linkage, recombination, and the mapping of genes on chromosomes d. Describe non-Mendelian inheritance • Students will be able to explain how genes are regulated a. Explain the regulation of genes in prokaryotes b. Explain the regulation of genes in eukaryotes c. Describe cell-cycle regulation and the genetics of cancer d. Explain how genetics is used to study development e. Explain the relationship between environmental exposure and cancer genetics ➢ Students should be able to explain how variation in chromosome number and structure occur. a) Explain different types of change in the chromosome number b) Explain different types of mutation on chromosome level c) Understand the relationship of mutation and genetic (inheritance) disease d) Explain different types of structural variation in chromosomes e) Understand the consequences of change in chromosome number and structure f) Explain what epigenetics is and the role in development of cancer External and internal factor that play a role in developing of cancer
Student's obligation	**Student's obligation** Attendance in lecture is expected. You are responsible for everything covered, mentioned, discussed and displayed in class. If you miss a class, get a classmate's notes as my notes will not be available. You cannot excel in this course if you do not come to class. 1- **Attendance**: students are strongly encouraged to attend class on a regular basis, as participation is important to understanding of the material. This is student opportunity to ask questions. Students are responsible for obtaining any information during the class which provided. 2- **Lateness**: Lateness to class is disruptive 3- **Electronic** devices: All cell phones are to be turned off at the beginning of class and put away during the entire class.

	4-**Talking**: During class, please refrain from side conversations. These can be disruptive to your fellow students and your professor
Required Learning Materials	- Printouts of weekly lectures taught at the college campus - Reviewing of internet
Forms of teaching	The material will be presented at a level suitable for undergraduates by lecturing, discussion, video, power points and seminar

Evaluation

Task		Weight (Marks)	Due Week	Relevant Learning Outcome
Paper Review				
Assignments	Homework	5%		Encourages students to search for more detailed knowledge relevant to the topics taught at campus.
	Class Activity	2%		
	Seminar	10%		Enhances the preparation and presenting skills of the students
	report	10%		To make students engage more with their favorite topics
	Project			
Quiz		8%		To encourage students, study every week.
Midterm Exam		25%		To evaluate students and their achievements at the middle of the term.
Final Exam		40%		Final evaluation and assessment.
Total		100%		

Specific learning outcome:

On successful completion of this course, the student will be able to:

a. Explain the way in which genes code for proteins
b. Understand patterns of inheritance
c. Understand the genetic basis of cancer
d. Understand the relationship of mutation and genetic (inheritance) disease
e. Explain what epigenetics is and the role in development of cancer
f. External and internal factor that play a role in developing of cancer

Course References:	Books: 1. Robert J. Brooker (2012). Genetics: analysis & principles (4th edition). 2. Tamarin R.H. (2001). Principles of Genetics (7th edition). 3. Anthony J.F. Griffiths, Susan R. Wessler, Sean B. Carroll and John Doebley, (2015). Introduction to genetic analysis. 4. James D. Watson / Tania A. Baker / Stephen P. Bell / Alexander Gann / Michael Levine / Richard Losick (2013). "Molecular Biology of the Gene (7th edition).

Course topics (Theory)	Week	Learning Outcome
An Introduction to Human Genetics	First	Introducing the Human Genetics module. Describing the general characteristics of chromosomes
Chromosomes and Cellular reproduction (Mitosis)	Second	Understanding mitotic cell division and how chromosomes are duplicated and passed to the next generation
Chromosomes and Cellular reproduction (Meiosis)	Third	Understand meiosis and how chromosomes are become half in number during gamete formation, as well as the important event of crossing-over
Patterns of Inheritance: Mendelian inheritance	Fourth	Understand the classical genetics, or mendelian inheritance
Patterns of Inheritance: Non-Mendelian inheritance	Fifth	Understand the inheritance of traits that are not following Mendel's two laws of genetics
Variation in chromosome number and structure: Natural variation exists in chromosome structure	Sixth	Describing the structure of chromosomes and how there's a natural variation in chromosomes, in different species
Midterm Exam	Seventh	
Variation in chromosome number: Polyploidy	Eighth	Understand how the number of chromosomal

		sets are changed and what are their consequences
Variation in chromosome number: Aneuploidy	Ninth	Understand how the number of individual chromosomes is changed and what are their consequences
Variation in chromosome structure: Deletions, Duplications	Tenth	Describing the variation in chromosome structure, duplications and deletions
Variation in chromosome structure: Inversions, Translocations	Eleventh	Describing the variation in chromosome structure, Inversions and translocations
Nucleic acid structure and function	Twelfth	Understand the experimental proof that DNA is the genetic material
Chromosome packaging	Thirteenth	Genome packaging in different organisms
Genetic basis of Cancer	Fourteenth	Describing the genetic basis of different cancer types

Questions Example Design (theoretical and practical exam):

All of the activities provided in the workload section are considered when awarding you a grade for this course. In order to pass this course, you will need to earn a 60% or higher on the final exam. Your score on the exam will be calculated as soon as you complete it. If you do not pass the exam on your first try, you may take it again in the second trial.

- Type of the exam (composition and multiple choice)
- Exam's duration (for example one hour)
- The number of the questions: at least four questions. The marks distributed evenly throughout.

The answer should contain preface, main contents and conclusion.

Example

Examinations (Type of the questions):

- **Open questions: Describe the consequences of chromosomal duplications and deletions**.
- **Fill in the blanks:** In cell cycle --------- phase known as synthetic phase.
- **Multiple choice questions:** The process of mitosis usually involves

  a. Chromosome duplication and synapsis.

b. DNA replication and separation of chromatids.

c. Tetrad formation and fertilization.

d. Reduction in chromosome number and formation of cell plate.

- **Short answer: Give short answers to the following questions.**
  - What are the stages of Prophase of meiosis I?
- **Matching:** Match the words in column A to the best available answer in column B.
- **Definition: Define the following terms:** a) homozygous, b) recessive, c) dominant

Extra notes:

External Evaluator