

Kurdistan Region Government

Ministry of Higher Education and Scientific Research

Erbil Polytechnic University

**Module (Course Syllabus) Catalogue**

**2023-2024**

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| **College/ Institute**  | **Health Technical College** |
| **Department** | **Medical Laboratory Technology** |
| **Module Name** | **Cell Biology & Histology** |
| **Module Code** | **ACB204** |
| **Degree** | **Technical Diploma Bachelor High Diploma Master PhD**1 |
| **Semester** | **2** |
| **Qualification** |  |
| **Scientific Title**  | **Assist. Prof.** |
| **ECTS (Credits)** | **6**1 |
| **Module type** | **Prerequisite Core Assist.** |
| **Weekly hours** | **3** |  |
| **Weekly hours (Theory)** | **(3)hr Class** | **( )Total hrs Workload** |
| **Weekly hours (Practical)** | **( )hr Class** | **( )Total hrs Workload** |
| **Number of Weeks** | **12** |
| **Lecturer (Theory)** | **Assist. Prof. dr. Twana Ahmed Mustafa** |
| **E-Mail & Mobile NO.** | **dr.twana@epu.edu.iq** |
| **Lecturer (Practical)** |  |
| **E-Mail & Mobile NO.** |  |
| **Websites**  |  |

**Course Book**

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| **Course Description** |  Students enter Medical Laboratory college with a wide variety of educational needs and learning styles. Accordingly, we offer a variety of learning resources with the hope that we can better meet their academic needs. The combination of lectures, handout materials, labs, large group sessions, optional texts and computing resources, and objective-based examinations should provide each student with a solid foundation in cell and pathology in anticipation of their future clinical training and medical practice.  • how pathologic analysis is used for diagnosis, assessing disease prognosis, disease surveillance, and assessing the response to therapy; and • the importance of self-directed and lifelong learning for assimilating new medical knowledge. Specific learning (session) objectives have been developed by all lecturers, and are included at the beginning of each lecture handout for each section of the Course. These session objectives build on the following course learning objectives: |
| **Course objectives** | Students who successfully complete this course will acquire in depth understanding and advanced knowledge of a range of general and specialized areas in cell biology. They will develop insight into the complexities of cell structure and function, the molecular controls that govern the cells’ dynamic properties, and cellular interactions with the organism as a whole. A further goal of this course is to educate and train the students in grant writing skills. Therefore, an important component of this course will be homework assignments consisting of developing research proposals based on selected hypothesis from the course topics. These assignments will receive written feedback from faculty who will comment on strengths and weaknesses of the students’ proposals. |
| **Student's obligation** | General advice:Attendance at all lectures is strongly recommended (but not required). Attendance at participatory activities such as presentations/discussions, and at any guest lectures is always required. Students who miss more than a few lectures often do poorly in class; such students will find little sympathy for their plight. The beginning of class may also include handing in assignments, quizzes, and discussion among the class that will be scored. (Consequently, please be on time.) For any missed lecture, a student should consult a fellow student for notes. Office hours are for further explanation and discussion, not a repeat of material presented in lecture.  |
| **Required Learning Materials**  |  |
| **Evaluation** | ‌ **Task** | **Weight (Marks)** | **Due Week** | **Relevant Learning Outcome** |
| Paper Review  | 50 |  |  |
| Assignments | Homework |  |  |  |
| Class Activity |  |  |  |
| Report |  |  |  |
| Seminar |  |  |  |
| Essay |  |  |  |
| Project |  |  |  |
| Quiz |  |  |  |
| Lab. |  |  |  |
| Midterm Exam |  |  |  |
| Final Exam | 50 |  |  |
| Total | 100 |  |  |
| **Specific learning outcome:** | After the course, the student should be able to:1. Students should understand the experimental basis from which modern cell biological knowledge comes; this includes being able to interpret experiments and evaluate conclusions from studies using:

a. Tissue culture (primary and clonal) b. Antibodies as specific probes for cellular components using several distinct protocols c. Recombinant gene expression studies and gene knockout and knockdown approaches d. Light and electron microscopy e. Protein purification and analysis f. Genetic analysis including epistasis experiments for ordering gene pathways 1. Students should understand the fundamentals of protein structure and how cellular stimuli regulate the activity of proteins. They should be able to describe example mechanisms for how posttranslational events like phosphorylation or GTP binding and hydrolysis translate into altered protein activity. Students should also be able to recognize a number of conserved protein domains and their functions.
2. Students should understand the makeup of cellular membranes throughout the cell; this includes phospholipid asymmetries between cytosolic and extracytosolic leaflets, the abundances of different lipids in different organelles, and the location of synthesis of the major lipid species. Students will also need to understand the different types of membrane proteins, their mechanisms of associations with membranes, and their mechanisms of constraint and microlocalization within membranes. Students should understand how the cell regulates transport across its membranes. This will include knowledge of the major groups and biochemical mechanisms of membrane transporters, ion pumps and channels
3. The students should understand the cell division cycle and its regulation. This will include understanding the historical elucidation of maturation promoting factor and our current molecular understanding of these kinase complexes, their targets, and how they effect cellular events. Students will know about many cell cycle regulators and be able to predict the effects of changes in their activities on rates of cell division and potential roles in cancer.
4. Students will know the major pathways of cell signaling originating from ligand binding by cell surface receptors. This will include tyrosine kinase and G-protein coupled receptors and their entire signaling cascades, second messenger systems, scaffolds and cellular effects.
5. Students will understand the cellular and genetic basis of cancer. This will include understanding the different types of mutations that accumulate in cancer and how they promote cell mitogenesis, tumor production or invasiveness. Common cellular modifications observed in cancer, such as GTPase deficient Ras, should be learned. Students should be able to predict whether a given mutation or modification would have oncogenic vs. tumor suppressor characteristics.
6. Students will learn the major pathways leading to and inhibiting programmed cell death, or apoptosis, and understanding the integration of these pathways with oncogenic and tumor suppressor effects in cancer
7. The students should be able to write a paper reviewing current research on the cell biology of a disease, incorporating scientific concepts from class that:

a. Identifies a sophisticated question for inquiry b. Synthesizes information from multiple sources c. Presents multiple perspectives and interpretations d. Demonstrates appropriate citation and documentation practices for cell biology e. Demonstrates competence in searching the appropriate electronic databases |
| **Course References‌:** | 63 Best Cell Biology Books of All Time - BookAuthorityMolecular Cell Biology 2 Vols Set by Mousumi Debnath, साइंस बुक, साइंस  बुक्स, विज्ञान पुस्तकें - Pointer Publishers, Jaipur | ID: 1232548955Fifth edition (2008) of MOLECULAR BIOLOGY OF THE CELL, by Alberts, Johnson, Lewis, Raff, Roberts and Walter. |
| **Course topics (Theory)** | **Week** | **Learning Outcome** |
| Introduction, course syllabus Biological Membrane and Channels | 1 | 1 &4 |
| Cytoskeleton  | 2 | 7 |
| Cell Adhesion  | 4 | 1 & 3 |
| Cell Cycle and check point regulation | 5 | 4 |
| Apoptosis | 6 | 1,2,3 & 4 |
| Cell Signaling | 7 | 3 & 4 |
| Drug Transport | 8 | 3 & 4 |
| Initial stages of embryonic development | 9-10 | 5 |
| Epithelial tissuesConnective tissuesMuscle TissueNervous tissue | 11 | 6 & 7 |
| Systemic Histology | 12 | 2 & 3 |
|  **Questions Example Design*****1. MCQ******2. Essay******3. Short Answers***  |
|  **Extra notes:** |
| **External Evaluator** |