Cell Biology; Code: (PB201 C)

A. Basic Information

Program(s) on which the course is given:	Bachelor of Pharmacy-(Pharm D Clinical)
Department responsible for offering the course:	Department of Biochemistry
Department responsible for teaching the course:	Department of Biochemistry (70% of the course) Department of Microbiology (30% of the course)
Academic year:	Level 1 – Spring Semester 2023-2024
Course title and code:	Cell Biology; Code: (PB 201C)
Prerequisite:	Registration
Credit hours:	Lecture: 1 (1) , Practical: 2 (1) , Total: 3 (1+1)
Course Coordinator:	Assoc. Prof. Dr. Amany Mohamed Kamal Shams Eldeen (Biochemistry) Dr. Massara Mohamed (Microbiology)

B. Professional Information

1 - Overall Aim of the Course

Upon successful completion of the first part of this course taught by the microbiology department (30% of the course), the students should be able to:

- Understand the cell theory,
- Identify the main characteristics of cells,
- Be able to differentiate between prokaryotic and eukaryotic cells,
- Be familiar with the different structures of prokaryotic cells.

Upon successful completion of this course by the biochemistry department (70% of the course), the students should be able to:

- Recognize the structure of the plasma membrane and cellular organelles.
- Understand the human genome and DNA organization,
- know steps of DNA Replication, Transcription and Translation,
- Explain the cell cycle as well as the transport of biomolecules across membranes.

2 -Course learning outcomes

Program key elements	Course learning outcomes
Domain 1: Fundamental knowledge: **The students should be able to:**	
1-1-1-1- Reveal the knowledge of micro-organisms & infectious/non-infectious diseases. Demonstrate understanding of micro-organisms, biological data & sterilization.	**1.1.1.1.** Demonstrate understanding of knowledge of the structure of the cell and its various organelles and their functions.
1-1-2-1- Make use of genetic, microbiological & epidemiological terms in pharmacy practice.	**1-1-2-1-** utilize the proper medical terms, and abbreviations.
1-1-6-1- Collect & utilize scientific information to enhance professional decision to save patient life and to prevent the spreading of infectious diseases	**1-1-6-1-** Collect and interpret information from scientific literature
1-1-6-2- Interpret scientific literature to enhance professional decision in production of high-quality medicine.	**1-1-6-2-** communicate biological concepts and understanding to members of a diverse scientific community as well as to the public.
1-1-7-1- Establish critical issues influencing the pharmaceutical industry.	**1-1-7-1-** Identify and critically analyze changes or losses in cell function influencing patient health.
1-1-7-2- Recognize emerging issues in patient health care.	**1-1-7-2-** analyzing different laboratory techniques handling blood samples and nucleic acids.
Domain 2: Professional and Ethical practice **The student will be able to:**	
2-1-2-a- Follow ethical standards of health care and pharmacy profession.	**2-1-2-a-** Handle and dispose biologicals and chemicals safely **2-1-2-b-** implement different lab procedures for preparation of biological samples.
2-1-3-1- Acknowledge personal limits &	**2-1-3-1-** Recognize own personal

endorse them professionally.	and professional limitations
2-1-3-2- Recognize rules & conditions regarding health care team members' guide.	**2-1-3-2-** accept the conditions of referral to or guidance from other members of the health care team.
2-3-1-1-Handle & dispose natural/synthetic biologic materials, biotechnology-based & radio-labeled products.	**2-3-1-1-** Recognize the techniques of biochemistry lab and their applications
2-3-1-2- Identify synthetic/natural pharmaceutical products used in the pharmaceutical field.	**2-3-1-2-** adopt ethical, legal, and safety guidelines for handling and disposal of different
2-3-2- Follow ethical & legal guidelines for handling and disposal of biological and pharmaceutical materials safely.	**2-3-2-a-** responsibility for hauling away waste generated in research labs. **2-3-2-b-** define biological waste management.
Domain 3: Pharmaceutical care **The students should be able to:**	
3-1-1- Integrate the basis of body physiology and genomics in health and disease states for various disorders management.	**3-1-1-a-** Apply the principles of cell structure and function 3-1-1-b- discussing current biomedical issues in a cellular context.
3-1-4-1- Relate the cause, spreading, pathological data and lab diagnosis of infections to pharmacotherapeutic approaches.	**3-1-4-1-** explain the process of translation in protein synthesis.
3-1-4-2- Correlate the etiology, pathophysiology, diagnosis, and clinical presentation of diseases to their pharmacotherapeutic approaches.	**3-1-4-2-** explain how the study of cell biology has resulted in medical advances.
Domain 4: Personal practice **The students should be able to:**	
4-1-1- Reveal healthcare team performance responsibility and evaluate team members	**4-1-1-a-** Demonstrate responsibility for team performance and express

showing time management skills.	time management skills. 4-1-1-b- behaves professionally.
4-1-2- Analyze data, solve problems, and work efficiently in a team.	**4-1-2-a**- Retrieve and critically analyze information and work autonomously and effectively asa team member. **4-1-2-b-** communicates essential information effectively within their small group and with other students in the class.
4-2-1-Communicate orally and in-writing with healthcare team, patients, and communities.	**4-2-1-a-** use verbal language effectively. **4-2-1-b**- use effective listening skills and elicits and provides information using effective, non-verbal, explanatory, and questioning skills.
4-2-2- Utilize modern technologies & media to acquire good presentation skills.	**4-2-2-a-** Demonstrate effective presentation skills using contemporary technologies and media. **4-2-2-b-** access online information and support their own education.
4-3-1- Apply professional self-assessment to enhance personal competencies.	**4-3-1-a-** Perform self-assessment to enhance professional and personal competencies. **4-3-1-b-** demonstrate an investigatory and analytical thinking approach.
4-3-2- Apply self-learning required for continuous professional development.	**4-3-2-a-** use information technology learning resources to manage basic science information. **4-3-2-b-** demonstrate a commitment to individual professional and personal growth

3. Course Contents

Week	Lectures		Practical	
	Topic	Credit hrs. (1)	Topics	Credit hrs. (1)
	Microbiology Department			
1	The cell	1	Introduction about microscopes + simple stain	1
2	Prokaryotic cell wall	1	Negative stain	1
3	Prokaryotic cell membrane and cell locomotion	1	Motility+ revision	1
	Biochemistry Department			
4	Cell membrane and organelles	1	Practical Exam (Microbiology)	**1**
5	Human genome and DNA organization	1	Specimen Collection Part I	1
6	**Midterm Exam**			
7	DNA Replication	1	Specimen Collection Part II	1
8	Transcription		DNA Extraction Part I	1
9	Translation		DNA Extraction Part II	1
10	Basic concepts of transport	1	RNA Extraction	1
11	Cell cycle	1	Introduction to Basics of Cell Culture Part I	**1**
12	Tutorial	1	Introduction to Basics of Cell Culture Part II	**1**
13	Formative Assessment	1	Practical Exam	
14	-		-	

15	**Written exam**	**-**
Total credit hours	**12**	**10**

4. Teaching and Learning Methods:

4.1. Lectures (Recorded videos, data show, LMS system- MOODLE, interactive lectures)
4.2. Practical sessions (Tools: lab glassware, chemical reagents)
4.3. Blended learning tools (videos, dry labs, discussions)
4.4. All lectures and practical labs will be recorded and posted on Moodle.

5- Student Assessment Methods:

Written Midterm exam	To assess	The ability of students to follow-up the course subjects.
Practical exam and assessment of semester work (class activities)	To assess	The ability of students to apply and practice scientific knowledge
Written final exam	To assess	The overall outcomes.
Oral exam	To assess	The ability of students in expressing and presenting their knowledge clearly and in systematic approach.

Assessment Schedule

Assessment 1	Periodic exams	Week 6
Assessment 2	Practical exam	Week 4 (Microbiology) Week 13 (Biochemistry)
Assessment 3	Oral exam	Week 15
Assessment 4	Final written exam	Week 15

Weighting of Assessments

Periodical Examination 15 marks

Final-term Examination 50 marks

Oral Examination 10 marks

Practical Examination 25 marks

Total 100

6- List of References

- Recommended books:

- Nalini Chandar, Lippincott Illustrated Reviews: cell and molecular biology (Lippincott Illustrated Reviews Series) Second edition, Philadelphia: Wolters Kluwer 2019, ISBN: 978146348500
- Denise Ferrier; Lippincott Illustrated Reviews: Biochemistry (Lippincott Illustrated Reviews Series) Seventh, North American Edition ISBN-13: 978-1496344496, ISBN-10: 1496344499
- Gerald Carp, janet Iwasa, Waalace Marshall. 2016. Cell and Molecular Biology Concepts and Experiments, 8th edition, John Wiley and sons Inc.

- ThemedicalBiochemistrypage.org

7. Facilities Required for Teaching and Learning

Modern libraries, audio-visual tools, chemicals, cooperative assistants, glassware and instruments

Course Coordinator: Assoc. Prof. Dr. Amany Mohamed Kamal Amany Kamal

Course members:

Assoc. Prof. Dr. Amany Mohamed Kamal (Biochemistry)

Dr. Massara Mohamed (Microbiology)

Acting Head of Biochemistry Department: Date: 13/2/2024

Associate Prof. Dr. Dina Hamada

Dina Hamada

Course name	Cell biology
Code	PB201 C

Course Plan & Matrices

Course Contents		Course learning outcomes	Teaching and Learning Methods	Student Assessment Methods
Week # 1	The cell -Practical: Introduction about microscopes + simple stain	1.1.1.1.b 2.1.2.a 2.1.2.b 2.3.1.1.b 2.3.1.2 2.3.2 4.1.1 4.2.1.a,b	Lectures, discussion, brainstorming, Practical	Written Practical
Week # 2	Prokaryotic cell wall -Practical: Negative stain	1.1.1.1.b 2.1.2.a 2.1.2.b 2.3.1.1.b 2.3.1.2 2.3.2 4.1.1 4.2.1.a,b	Lectures discussion brainstorming, Practical	Written Practical
Week # 3	Prokaryotic cell membrane and cell locomotion -Practical: Motility	1.1.1.1.b 2.1.2.a 2.1.2.b	Lectures discussion brainstorming,	Written Practical

	+ revision	2.3.1.1.b 2.3.1.2 2.3.2 4.1.1 4.2.1.a,b	Practical	
Week # 4	Cell membrane and organelles Practical: exam (Microbiology department)	1.1.1.1. 1.1.2.1. 1.1.6.1. 1.1.6.2. 1.1.7.1. 3.1.1.a. 3.1.1.b 3.1.4.2 4.1.1.a 4.1.1b 4.1.2.a 4.1.2.b 4.2.1.a 4.2.1.b 4.2.2.a 4.2.2.b 4.3.1.a 4.3.1.b 4.3.2.a 4.3.2.b	Lectures Open discussion brain storming Assignments, Practical training, Self-learning	Written Oral Practical (including activities)
Week # 5	Human genome and DNA organization	1.1.1.1. 1.1.2.1.	Lectures Assignments,	Written Oral

	Specimen Collection Part I	1.1.6.1. 1.1.6.2. 1.1.7.1. 1.1.7.2. 2.1.2.a 2.1.2.b 2.1.3.1 2.1.3.2 2.3.1.1 2.3.1.2 2.3.2.a 2.3.2.b 3.1.1.a. 3.1.1.b 3.1.4.2 4.1.1.a 4.1.1b 4.1.2.a 4.1.2.b 4.2.1.a 4.2.1.b 4.2.2.a 4.2.2.b 4.3.1.a 4.3.1.b 4.3.2.a 4.3.2.b	Practical training,	Practical (including activities)

Week # 6	**Midterm exam**			
Week # 7	DNA Replication Specimen Collection Part II	1.1.1.1. 1.1.2.1. 1.1.6.1. 1.1.6.2. 1.1.7.1. 1.1.7.2. 2.1.2.a 2.1.2.b 2.1.3.2 2.3.1.1 2.3.1.2 2.3.2.a 2.3.2.b 3.1.1.a. 3.1.1.b 3.1.4.2 4.1.1.a 4.1.1b 4.1.2.a 4.1.2.b 4.2.1.a 4.2.1.b 4.2.2.a 4.2.2.b 4.3.1.a 4.3.1.b	Lectures Practical training	Written Oral Practical (including activities)

		4.3.2.a 4.3.2.b		
Week # 8	Transcription DNA Extraction Part I	1.1.1.1. 1.1.2.1. 1.1.6.1. 1.1.6.2. 1.1.7.1. 1.1.7.2. 2.1.2.a 2.1.2.b 2.1.3.1 2.1.3.2 2.3.1.1 2.3.1.2 2.3.2.a 2.3.2.b 3.1.1.a. 3.1.1.b 3.1.4.1 3.1.4.2 4.1.1.a 4.1.1b 4.1.2.a 4.1.2.b 4.2.1.a 4.2.1.b 4.2.2.a	Lectures Practical training	Written Oral Practical (including activities)

		4.2.2.b 4.3.1.a 4.3.1.b 4.3.2.a 4.3.2.b		
Week # 9	Translation DNA Extraction Part II	1.1.1.1. 1.1.2.1. 1.1.6.1. 1.1.6.2. 1.1.7.1. 1.1.7.2. 3.1.1.a. 3.1.1.b 3.1.4.1 3.1.4.2 4.2.1.a 4.2.1.b 4.2.2.a 4.2.2.b 4.3.1.a 4.3.1.b 4.3.2.a 4.3.2.b	Lectures Assignments	Written Oral
Week # 10		1.1.1.1. 1.1.2.1. 1.1.6.1. 1.1.6.2.	Online interactive discussion Assignments	Written Oral

	Basic concepts of transport RNA Extraction	1.1.7.1. 1.1.7.2. 3.1.1.a. 3.1.1.b 3.1.4.1 3.1.4.2 4.2.1.a 4.2.1.b 4.2.2.a 4.2.2.b 4.3.1.a 4.3.1.b 4.3.2.a 4.3.2.b		
Week #11	Cell Cycle Introduction to Basics of Cell Culture Part I	1.1.1.1. 1.1.2.1. 1.1.6.1. 1.1.6.2. 1.1.7.1. 1.1.7.2. 3.1.1.a. 3.1.1.b 3.1.4.1 3.1.4.2 4.2.1.a 4.2.1.b 4.2.2.a	Online interactive discussion Assignments	Written Oral

		4.2.2.b 4.3.1.a 4.3.1.b 4.3.2.a 4.3.2.b		
Week # 12	Tutorial Introduction to Basics of Cell Culture Part II	1.1.1.1. 1.1.2.1. 1.1.6.2. 1.1.7.1. 1.1.7.2. 3.1.1.a. 3.1.1.b 4.2.1.a 4.2.1.b 4.2.2.a 4.2.2.b 4.3.1.a 4.3.1.b 4.3.2.a 4.3.2.b	Online interactive discussion Assignments	Written Oral
Week # 13	Formative assessment Practical Exam	1.1.1.1. 1.1.2.1. 1.1.6.1. 1.1.6.2. 1.1.7.1. 1.1.7.2. 3.1.1.a.	Online interactive discussion Assignments	Written Oral

		3.1.1.b 3.1.4.1 3.1.4.2		
Week #15	Written Exam			

In case of pandemic spreading, the study will be suspended, and the lectures will be converted to recorded and interactive lectures.

تم الاعتماد فى محضر مجلس قسم الكيمياء الحيوية رقم (5) بتاريخ 2024/2/13