Course Specification
(Bachelor)

Course Title:	Cell Biology
Course Code:	BIO 1113
Program :	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University
Version	02
Last Revision Date:	2023

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A. General information about the course:

1. Course Identification

1. Credit hours: (……)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	Others
B.	☐Required		☐Elective		
3. Level/year at which this course is offered: (Level 3 / First Year.)					
4. Course general Description: This Cell Biology course explores the structure, function, and dynamics of cells as the basic units of life. It covers cellular organization, organelles, membrane transport, energy production, cell division, signaling, and apoptosis. Emphasizing molecular mechanisms and their relevance to health and disease, the course combines lectures, practical lab sessions, and interactive discussions. Students will gain foundational knowledge and skills in microscopy, cell staining, and modern research techniques, preparing them for advanced studies in molecular biology, genetics, and biotechnology. Prerequisites include basic biology and chemistry from the first year.					
5. Pre-requirements for this course (if any): BIO - 1101					
6. Co-requisites for this course (if any): None					
7. Course Main Objective(s):					
7. Course Main Objective(s To provide a comprehensive understanding of cellular structure, organization, and functions; explore molecular mechanisms governing cellular processes such as energy production, signaling, and division; develop practical skills in microscopy, staining, and cellular analysis; analyze the role of cellular functions in physiological and pathological contexts; foster critical thinking in understanding cellular biology; and prepare students for					

advanced studies and careers in molecular biology, genetics, and biotechnology.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	6	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	4
2.	**Laboratory/Studio**	2
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		6

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Demonstrate a thorough understanding of cellular structure, organelles, and their functions**	1.1	Interactive lectures, visual aids (diagrams, videos), group discussions.	Quizzes, exams, and class participation.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.2	**Explain the molecular mechanisms underlying key cellular processes such as energy production, cell signaling, and division**	**1.2**	Lectures with case studies, problem-solving sessions, and assigned readings.	Written exams, problem-solving assignments, and concept-based quizzes.
2.0	**Skills**			
2.1	**Apply laboratory techniques such as microscopy and staining to study cell structure and function.**	**2.1**	**Hands-on lab sessions, demonstrations, and guided experiments.**	**ab reports, practical exams, and observation of technical skills.**
2.2	**Analyze the relationship between cellular functions and their implications in physiological and pathological conditions.**	**2.1**	**Case study analysis, group presentations, and class discussions.**	**Case study evaluations, presentation assessments, and exams.**
2.3	**Develop critical thinking and problem-solving skills in cellular biology and its applications**	**2.1-2.2**	**Problem-based learning (PBL), group projects, and research assignments.**	**Research projects, group presentations, and reflective essay**
3.0	**Values, autonomy, and responsibility**			
3.1	**Integrate foundational knowledge to pursue advanced studies in molecular biology, genetics, and biotechnology.**	2.2	**Capstone assignments, discussions on advanced topics, and mentorship for career pathways.**	**Capstone project evaluations, comprehensive final exams, and feedback sessions**
3.2	**To operate laboratory instruments and**	**3.3**	**Virtual labs.**	**Laboratory performance**

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	computers.			**and reports.**
3.3	**To Perform biological experiments and handle various slides during laboratory classes.**	**3.1-3.3**	**Demonstrations.**	**Laboratory performance and reports.**

C. Course Content

No	List of Topics	Contact Hours
1	• **Introduction to Cell Biology and Types of Cells** Overview of cell biology, prokaryotic vs. eukaryotic cells, plant vs. animal cells, and unicellular vs. multicellular organisms.	**2**
2	• **Structure and Functions of Prokaryotic and Eukaryotic Cells** Detailed comparison of prokaryotic and eukaryotic cells, with emphasis on cellular complexity and functional differences.	**2**
3	• **The Plasma Membrane and Cellular Boundaries** Structure and function of the plasma membrane, membrane transport, and cell communication.	**2**
4	• **Cell Organelles: Overview and General Functions** Cytoplasm, cytoskeleton, ribosomes, and peroxisomes in cellular structure and dynamics.	**2**
5	• **The Nucleus and Genetic Material** Structure and function of the nucleus, DNA organization, replication, transcription, translation, and gene expression regulation.	**2**
6	• **Endomembrane System: ER, Golgi Apparatus, and Lysosomes** Functions of the rough and smooth endoplasmic reticulum, Golgi apparatus, vesicular transport, and lysosomes in protein processing and secretion.	**2**
7	• **Mitochondria and Energy Production** Structure of mitochondria, ATP production, and cellular respiration.	**2**
8	• **The Cell Cycle**	**2**
9	• **Mitosis and Meiosis** Detailed mechanisms of mitosis and meiosis, comparison of processes, and their roles in growth and reproduction.	**2**
10	• **Integration of Cellular Functions and Applications** Coordination of cellular processes, implications in health and disease, and advancements in cell biology research.	**2**
	Total	**20**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm 1	Around 6th - 7th week	15%
2.	Midterm 2	Around 11th - 12th week	15%
3.	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab reports.	All the semester	5%
6	Lab Exam.	Around 15th week	15 %
7	Total		100%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2014). *Molecular Biology of the Cell* (6th Edition). Garland Science. ○ A comprehensive guide to cell biology, covering fundamental concepts and advanced topics. 2. Cooper, G. M., & Hausman, R. E. (2018). *The Cell: A Molecular Approach* (8th Edition). Sinauer Associates. ○ Provides an accessible overview of molecular and cellular biology with practical insights. Supplementary Textbooks: 1. Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Bretscher, A., Ploegh, H., & Amon, A. (2021). *Molecular Cell Biology* (9th Edition). W. H. Freeman. ○ Focuses on cellular and molecular mechanisms with in-depth illustrations and examples. 2. Karp, G. (2020). *Cell and Molecular Biology: Concepts and Experiments* (9th Edition). Wiley. ○ Combines experimental techniques with

	theoretical cell biology concepts..
Supportive References	Campbell, N.A. and Reece, J. B. (2008) Biology 8th edition, Pearson Benjamin Cummings, San Francisco. • Griffiths, A.J.F et al (2008) Introduction to Genetic Analysis, 9th edition, W.H. Freeman & Co. NY • Raven, P.H et al (2006) Biology 7th edition Tata mcgrawhill Publications, New Delhi
Electronic Materials	PubMed (https://pubmed.ncbi.nlm.nih.gov) • A valuable resource for accessing the latest research articles in cell biology. Khan Academy Cell Biology (https://www.khanacademy.org) • Interactive and beginner-friendly tutorials covering key cell biology concepts. Biology Online (https://www.biologyonline.com) • Offers detailed explanations of cellular processes and terminology.
Other Learning Materials	Presentations for all lectures prepared by Dr.Amr Elkelish

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students
Technology equipment (projector, smart board, software)	The computers are equipped with different software's.
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, centrifuges, incubators, ovens and other glass wares.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Course coordinator	At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and

Assessment Areas/Issues	Assessor	Assessment Methods
		identifying changes that need to be made if necessary
Effectiveness of Students assessment	Students	At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.
Quality of learning resources	Peer Reviewer	Reviewing the course reports submitted at the end of each semester.
The extent to which CLOs have been achieved	Quality committees	Check a sample of marking by independent faculty member.
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	