هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	*Molecular Biology*
Course Code:	*BIO1309*
Program:	*Bachelor of Science in Biology*
Department:	*Department of Biology*
College:	*Faculty of Science*
Institution:	*University of Tabuk*
Version:	***Course Specification Version Number***
Last Revision Date:	*September 2023*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:					
3 Credit (2 theoretical + 1 practical) hours.					
2. Course type					
A.	☐University	☐ College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (6th Level / 3rd year)					
4. Course general Description:					
This course covers topics on introduction and overview of course, prokaryotic and eukaryotic cell cycles, DNA replication, repair and recombination, structure and function of chromosome, as well as operon of prokaryotic and eukaryotic cell, gene clusters and genes in organelles. ribosomes, protein biosynthesis and transportation, and genetic engineering.					
5. Pre-requirements for this course (if any)**:**					
General Genetics (BIO1305).					
6. Co-requirements for this course (if any)**:**					
None					
7. Course Main Objective(s):					
By the end of this course, the students should be able to: - Understanding of the organization, replication and expression of the genetic material in prokaryotic and eukaryotic cells. - Understanding of contemporary methods and approaches used in analysis of gene structure and function. - Solve issues applying molecular biology techniques.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	50%
2	E-learning		
3	Hybrid • Traditional classroom		

No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4	Distance learning		
5	**Others (Lab work)**	2	50%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		**60**

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe structure of DNA, RNA and protein, their interrelationships and the basic idea of importance of molecular biology.	K1	-Lectures. -Class discussion. -Group discussion. -Case studies.	-Quizzes -Midterm examination. -Final examination. -Class discussion and participation. - Homework (Problem-solving).
1.2	Define Cell cycle, DNA replication, Operon, Protein	K2	-Lectures. -Class discussion.	-Quizzes

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	biosynthesis, genetic engineering.		-Group discussion. -Homework assignments. -Case studies.	-Midterm examination. -Final examination. -Class discussion and participation. -Homework assignments.
2.0	**Skills**			
2.1	Apply major techniques relating to molecular biology.	S1	-Lectures. - Laboratory work. -Class discussion. -Group discussion. -Brainstorming.	-Quizzes -reports -Final examination. -Class discussion and participation. - Homework (Problem-solving).
2.2	Solve the practical problems in modern biology.	S2	-Lectures. -Class discussion. -Group discussion. -Brainstorming. -Laboratory work.	-Quizzes -reports -Final examination. -Class discussion and participation. - Homework (Problem-solving).

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.2	Employ web-based searching on the topics of modern molecular biology.	S3		
3.0	**Values, autonomy, and responsibility**			
3.1	Work in a team and independently to conduct a specific project.	V1	-Class discussion. -Group discussion.	-Class discussion and participation. -Homework (Problem-solving).

C. Course Content

No	List of Topics	Contact Hours
1.	Course Introduction.	2
2.	Overview: a brief history of molecular genetics & molecular terminology.	2
3.	DNA & RNA molecular structure.	2
4.	Chromosome structure and function Chromatin.	2
5.	Chromatin packaging and epigenetics.	2
6.	DNA Replication.	2
7.	DNA repair & recombination.	2
8.	Protein synthesis: transcription.	2
9.	Protein synthesis: translation.	2
10.	Ribosomes, protein transportation, structure & function.	2
11.	Gene structure & regulation in prokaryotic.	2
12.	Gene structure & regulation in eukaryotic: transcription factors, tumor suppressor & oncogenes.	2
13.	Gene clusters.	2
14.	Genetic engineering: part 1.	2
15.	Genetic engineering: part 2.	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Class Participation	During whole teaching period	5
2.	Homework (Problem-solving)	3 to 13	5
3.	Short Exams (Quizzes)	During whole teaching period	5
4.	Midterm Theoretical Examination	8-9	20
4.	Reports (For Practical)	During whole teaching period	10
5.	Final Practical Examination	15	15
6.	Final Theoretical Examination	17	40

*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	- Bruce Alberts et.al. (2022): Molecular Biology of the cell. W. W. Norton & Company; 7th edition. - Jocelyn E. Krebs, Elliott S. Goldstein, Stephen T. Kilpatrick. (2011): Lewin's Genes X. Sudbury, Mass.:Jones and Bartlett.
Supportive References	- Hartwell L, Hood L, Goldberg ML. et al. (2000) Genetics: from Genes to Genomes. Boston: McGraw Hill. - Lodish H, Berk A, Zipursky SL. Et. Al. (2000). Molecular Cell Biology, 4thedn. New York. WH Freeman. - Sambrook J and Russel DW (2001) Molecular Cloning: A laboratory manual. Cold Spring Harbour Laboratory Press. New York.
Electronic Materials	- Friedberg EC, Walker GC & Siede W (1995) DNA Repair and mutagenesis. Washington DC: ASM Press. - Lodish, Berk, Kaiser, Krieger, Scott, Bretscher. Ploegh (2008): Molecular Cell Biology, 6th Edition.

	- Darnell. W. H. Freeman and Company, New York.
	- Genetics: From Genes to Genomes (Hardcover),by Leland Hartwell, Leroy Hood, Michael L.2006.
	- Recommended Journals:
	  ○ Molecular Biology Reports.
	  ○ Journal of molecular biology.
	  ○ Marine Genomics.
	  ○ Gene.
	  ○ Nature (Biotechnology).
	  ○ PLOS One.

Other Learning Materials	- www.yk.rim.or.jp/~aisoai/index.html - www.hpc.unm.edu/~aroberts/main/molbio.htm

2. Required Facilities and equipment

Items	Resources
Accommodation ,Classrooms, laboratories, demonstration rooms/labs, etc	- A sufficient number of classrooms to accommodate students. - Well-equipped practical laboratories to accommodate students
Technology Resources (AV, data show, Smart Board, software, etc.)	- Data show - Wireless connection in the building for students and faculties.
Other Resources Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list	- Well-equipped lab, samples slides, microscope.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	- Students. - Faculty members.	Indirect & direct: - Questionnaires. - Meetings.
Effectiveness of Students assessment	- Quality and development committee. - Department chair.	- Course report. - Program annual report.
Quality of learning resources	- Plan and program committee. - Students. - Staff members.	Indirect & direct: - Questionnaires. - Meetings. - Reports.
The extent to which CLOs have been achieved	- Quality and development committee.	Indirect & direct: - Questionnaires. - Meetings.

Assessment Areas/Issues	Assessor	Assessment Methods
	- Peer Reviewer. - Program leaders	- Reports.
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	PROGRAMS AND STUDY PLANS COMMITTEE
REFERENCE NO.	
DATE	SEPTEMBER 2023