



Course Specifications

Course Title:	Molecular Biology
Course Code:	BIO420
Program:	Bachelor of Science in Biology
Department:	Department of Biology
College:	Faculty of Science
Institution:	University of Tabuk

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A. Course Identification

1. Credit hours:	3 (2 Theoretical + 1 Practical) hours			
2. Course type				
a.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/>	Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>		
3. Level/year at which this course is offered:	Level 8/ Second semester/ Fourth year			
4. Pre-requisites for this course (if any):	Cell Biology (BIO222)			
5. Co-requisites for this course (if any):	None			

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	50%
2	Blended		
3	E-learning		
4	Distance learning		
5	Practical	2	50%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	26
2	Laboratory/Studio	26
3	Tutorial	
4	Others (specify)	
	Total	52

B. Course Objectives and Learning Outcomes

1. Course 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.

2. Course Main Objective

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.
- Experience and confidence in applying this knowledge to solve new and interesting problems in molecular biology.



3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	To describe structure of DNA, RNA and protein, their interrelationships and the basic idea of importance of molecular biology.	K1
1.2	To define Cell cycle, DNA replication, Operon, Protein biosynthesis, genetic engineering.	K1
2	Skills :	
2.1	To apply major techniques relating to molecular biology.	S1
2.2	To solve the practical problems in modern biology.	S5
2.3	To employ web-based searching on the topics of modern molecular biology.	S3
3	Values:	
3.1	To work independently and as a part of a team.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction and overview of course	2
2	Prokaryotic cell cycles	2
3	Eukaryotic cell cycles	2
4	DNA Replication	2
5	DNA Repair and Recombination	2
6	Chromosome structure and function	2
7	Chromosome structure and function, chromatin	2
	Midterm Exam	
8	Prokaryotic and eukaryotic operon structure & function.	2
9	Prokaryotic and eukaryotic gene clusters and genes in organelles.	2
10	Ribosomes, protein biosynthesis	2
11	Ribosomes, protein transportation	2
12	Genetic engineering	2
13	Genetic engineering	2
	Final Exam	
Total		26

No	(List of Topics (Laboratory part	Contact Hours
1	Introduction to Molecular Biology, Lab Safety Basic Instruments	2
2	Cell Cycle	2
3	Examination of mitosis in onion root tips	2
4	Examination of mitosis in onion root tips	2
5	Isolation of genomic DNA from medicinal plant by SDS method	2
6	DNA Replication	2



7	DNA Replication	2
	Midterm practical Exam	
8	Polymerase Chain Reaction (PCR)	2
9	Polymerase Chain Reaction (PCR)	2
10	ISSR marker analysis for medicinal plant identification	2
11	ISSR marker analysis for medicinal plant identification	2
12	DNA Transcription	2
13	DNA translation	2
	Final Exam	
Total		26

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	To describe structure of DNA, RNA and protein, their interrelationships and the basic idea of importance of molecular biology.	- Lecture - Case studies and articles.	- Quizzes. - Homework.
1.2	To define Cell cycle, DNA replication, Operon, Protein biosynthesis, genetic engineering.	- Activities and homework.	- Final exams.
2.0	Skills		
2.1	To apply major techniques relating to molecular biology.	- Lectures. - Individual and small group tasks.	- Assessment of lab reports and practical examinations.
2.2	To solve the practical problems in modern biology.	- Short essay. - Lab.	- Individual and group presentations.
2.3	To employ web-based searching on the topics of modern molecular biology.	- Individual presentation and working as a part of group.	
3.0	Values		
3.1	To work independently and as part of a team.	- Essay writing. - Lab. demonstration. - Individual presentation or group.	- Oral and written scientific report. - Interactive discussion and precipitation. - Work in groups.

2. Assessment Tasks for Students

#	*Assessment task	Week Due	Percentage of Total Assessment Score
1	Quizzes + Assignments + Class discussion	1-13	10%
2	Midterm Theoretical Exam	8	25%
3	Midterm Practical Exam	8	10%



#	*Assessment task	Week Due	Percentage of Total Assessment Score
4	Final Practical Exam	14	15%
5	Final Theory Exam	15	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- Office hours: 6 hours / week.
- Academic Guidance for about 30 students as determined by admission and registration.
- Direct supervision of staff for lab works.
- Electronic communication through university web page and e-mail.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	- Bruce Alberts et.al. (1994): Molecular Biology of the cell. Garland; 3rd edition, ISBN-10: 0815316194, ISBN -13: 978-081531619.
Essential References Materials	- 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: - <i>Molecular Biology Reports</i> . - <i>Journal of molecular biology</i> . - <i>Marine Genomics</i> . - <i>Gene</i> . - <i>Nature (Biotechnology)</i> . - <i>PLOS One</i> .
Other Learning Materials	- www.yk.rim.or.jp/~aisoai/index.html - www.hpc.unm.edu/~aroberts/main/molbio.htm



2. Facilities Required

Item	Resources
Accommodation Classrooms, laboratories, demonstration) (.rooms/labs, etc)	- A sufficient number of classrooms, well equipped -practical laboratories are available to accommodate students. -Virtual session provided by the blackboard (which allow discussions, and sharing PowerPoint and video).
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	-Electrophoresis set with power pack, UV Trans illuminator, PCR machine, Refrigerated centrifuge machine, Micro-pipettes, Milli Q Water apparatus.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of teaching and assessment.	- Students.	Indirect - Questionnaires.
- The extent of achieving the course learning outcomes.	- Program committee. - Staff members. - Students.	Direct - Questionnaires. - Reports. - Meetings
- Quality of learning resources.	- Program leaders. - Peer Reviewer.	Direct & Indirect - Questionnaires. - Reports. - Meetings

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Biology Department Council
Reference No.	
Date	1/6/2022

