Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY for MEDICALS & APPLIED SCIENCES

Faculty of Medicine

Bachelor Program of Medicine and Surgery

Course Specification of

Molecular Biology & Genetics

Course Code. (A21P213)

2023

T4: This Template is Developed and Approved by CAQA-Yemen, 2023

Prepared by:	Reviewed by:	Head of department	Quality Unit:	Dean of Medicine Faculty	Center of Development and Quality Assurance Dean
Dr. Waled Al-Dubai	Assoc. prof. Ebtesam Al-Zabedi		Dr. Fadhl Shujaa Al-deen	Dr. Salwa Al-Ghomeri	

I. General Information:

1.	Course Title:	Molecular Biology & Genetics				
2.	Course Code:	A21P213				
3.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours	
			Lecture	Tutorial/ Seminar	Lab	Clinical
		2	2	--	--	--
4.	Level/ Semester at which this Course is offered:	Second Level / First Semester				
5.	Pre –Requisite (if any):	None				
6.	Co –Requisite (if any):	None				
7.	Program (s) in which the Course is Offered:	Bachelor of Medicine & Surgery				
8.	Language of Teaching the Course:	English				
9.	Location of Teaching the Course:	Faculty of Medicine				
10.	Prepared by:	Dr. Waled Al-Dubai				
11	Date and Number of Approval by Council:	2023				

II. Course Description:

Molecular biology and genetics have become an important course in the practice of medicine, because they help students in understanding molecular mechanism of genetic diseases inheritance, diagnosis, and identification the causes of many genetic disorders. Molecular biology and genetics focus on DNA and RNA chemistry, DNA Replication, repair, Gene expression, Transcription, RNA processing, Translation, mutations, classification of genetic disorders, the typical and atypical modes of genetic diseases inheritance, and PCR technique.

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs		
A. Knowledge and Understanding:		**I, P or M/A**		
a1	Describe chemistry of DNA, RNA, replication, transcription, translation, mutation ,gene expression, DNA damage and repair	**M**	**A1**	Describe the general and basic sciences related to human body structure and functions with emphasis on normal and abnormal conditions
a2	Identify the principle and application of PCR	**M**		
a3	List the features of typical and atypical modes of genetic diseases inheritance	**M**		
a4	Classify genetic diseases	**M**		
B. Intellectual Skills:				
b1	Interpret the molecular basis of genetic disorders	**A**	**B1**	Compare between normal and abnormal conditions and predict the appropriate treatment or intervention
C. Professional and Practical Skills:				
c1				
D. Transferable Skills:				
d1	Present information in a professional way	**I**	**D1**	Communicate with professionals, patients, their families and the community through verbal, written and other non-verbal means.
d2	Use computer and internet to get up-to-date information	**I**	**D2**	. Work individually or in a team and develop lifelong learning using up to date technology that help in understanding the diseases and its control and prevention.

I= Introduced, P=Practiced or M/A= Mastered/Advanced

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Describe chemistry of DNA, RNA, replication, transcription, translation, mutation ,gene expression, DNA damage and repair	▪ Interactive lectures ▪ Presentation	▪ Written exam mid and final terms)
a2	Identify the principle and application of PCR		
a3	List the features of typical and atypical modes of genetic diseases inheritance		
a4	Classify genetic diseases		

(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
b1	Interpret the molecular basis of genetic disorders	▪ Interactive lectures ▪ Self-learning ▪ Presentation	▪ Written exam (mid and final terms)

(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
c1		▪	▪

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
d1	Present information in a professional way	▪ Presentation ▪ Self-learning	Assignments ▪ Homework ▪ Teamwork
d2	Use computer and internet to get up-to-date information		

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Molecular Biology**	Chemistry of DNA and RNA	1	2	a1, d1,d2
		DNA replication	1	2	a1, d1,d2
		DNA damage and repair	1	2	a1,b1, d1,d2
		Gene expression	1	2	a1, d1,d2
		Transcription and RNA processing	1	2	a1, d1,d2
		Mutations	1	2	a1,b1, d1,d2
		Translation	1	2	a1, d1,d2
		Polymerase chain reaction (PCR)	1	2	a2,b1, d1,d2
2	**Mid-Term Theoretical Exam**	MCQs and essay questions	1	2	a1,a2, b1
3	**Genetics**	-Definition of genetics -Important terms in genetics -Classification of genetic diseases	1	2	a4, b1, d1 ,d2
		Typical modes of genetic diseases inheritance with examples -Autosomal dominant inheritance Familial hypercholesterolemia - Autosomal recessive inheritance Phenylketonuria (PKU) Cystic Fibrosis -X-linked dominant inheritance Fragile X syndrome	3	6	a3, b1, d1,d2

		- X-linked recessive inheritance Duchenne and Becker muscular dystrophies -Y-linked inheritance Y chromosome infertility - Codominant inheritance Alpha-1 antitrypsin deficiency			
		Atypical modes of genetic diseases inheritance - Mitochondrial inheritance -Genomic imprinting Prader-Willi syndrome -Moasicism -Uniparental Disomy Beckwith-Wiedemann syndrome -Epigenetics	2	4	a3, b1, d1,d2
4	**Final Theoretical Exam**	MCQs and essay questions	1	2	a1, a2,a3,a4 b1
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	None			
Number of Weeks /and Units Per Semester				

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	None			
2				

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
Number of Weeks /and Units Per Semester				

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Searching information about related subjects of molecular biology and genetics	5th	10	d1,d2
Total			10	

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	5th	10	10%	d1,d2
2	Mid-Term Theoretical Exam	7th	20	20%	a1,a2, b1
3	Final Theoretical Exam	16th	70	70%	a1, a2,a3,a4 b1
Total			100	100%	

IX. Learning Resources:

1- Required Textbook(s):

1- - Nalini Chandar, Susan Viselli,2018, Lippincott's Illustrated Reviews:Cell and Molecular Biology, 2nd edition, Wolters Kluwer, United State of America.

2- 1-Ricki Lewis (2018). Human Genetics: Concepts and Applications.12th ed.McGraw-Hill Education. USA

2- Essential References:

3- Ricki Lewis (2017). Human genetics: the basics .Second edition. Routledge.UK

4- Laura M. Gunder McClary. (2020). Essentials of medical genetics for nursing and health professionals : an interprofessiona approach.1st edn Jones & Bartlett Learning. USA

3- Electronic Materials and Web Sites etc.:
Websites: 5- Learn. Genetics https://learn.genetics.utah.edu/ **Journals:** 2-The American Journal of Human Genetics - Cell Press https://www.cell.com/ajhg/home **Other Web Sources:** 3-Genetics Animations http://www.dnaftb.org/13/animation.html

X. Course Policies: (Based on the Uniform Students' By law (2007)

1	**Class Attendance:** Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	**Tardiness:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	**Exam Attendance/Punctuality:** No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	**Assignments & Projects:** Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	**Cheating:** Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	**Forgery and Impersonation:** Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	**Other policies:**

	The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Faculty of Medicine

Department of Medicine

Bachelor Program of Medicine & Surgery

Course Plan (Syllabus) of

Molecular Biology & Genetics

Course Code. A21P213

I. Information about Faculty Member Responsible for the Course:								
Name of Faculty Member:		**Office Hours**						
Location& Telephone No.:	-----							
E-mail:	--@--.--	SAT	SUN	MON	TUE	WED	THU	

2023

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			Lecture	**Tutorial/ Seminar**	**Lab**	**Clinical**
		2	2	--	--	--
4.	**Level/ Semester at which this Course is offered:**	Second Level / First Semester				
5.	**Pre –Requisite (if any):**	None				
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IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

a1	Describe chemistry of DNA, RNA, replication, transcription, translation, mutation ,gene expression, DNA dam
a2	Identify the principle and application of PCR
a3	List the features of typical and atypical modes of genetic diseases inheritance
a4	Classify genetic diseases

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IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Molecular Biology**	Chemistry of DNA and RNA	1	2
		DNA replication	1	2
		DNA damage and repair	1	2
		Gene expression	1	2
		Transcription and RNA processing	1	2
		Mutations	1	2
		Translation	1	2
		Polymerase chain reaction (PCR)	1	2
2	**Mid-Term Theoretical Exam**	MCQs and essay questions	1	2
3	**Genetics**	-Definition of genetics -Important terms in genetics -Classification of genetic diseases	1	2
		Typical modes of genetic diseases inheritance with examples -Autosomal dominant inheritance Familial hypercholesterolemia - Autosomal recessive inheritance Phenylketonuria (PKU) Cystic Fibrosis -X-linked dominant inheritance Fragile X syndrome - X-linked recessive inheritance Duchenne and Becker muscular	3	6

		dystrophies -Y-linked inheritance Y chromosome infertility - Codominant inheritance Alpha-1 antitrypsin deficiency		
		Atypical modes of genetic diseases inheritance - Mitochondrial inheritance -Genomic imprinting Prader-Willi syndrome -Moasicism -Uniparental Disomy Beckwith-Wiedemann syndrome -Epigenetics	2	4
4	**Final Theoretical Exam**		16	2
Number of Weeks /and Units Per Semester			**16**	**32**

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	None		
Number of Weeks /and Units Per Semester			

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Molecular Biology**	Chemistry of DNA and RNA	1	2
		DNA replication	1	2
		DNA damage and repair	1	2
		Gene expression	1	2
		Transcription and RNA processing	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		Mutations	1	2
		Translation	1	2
		Polymerase chain reaction (PCR)	1	2
2	**Mid-Term Theoretical Exam**	MCQs and essay questions	1	2
3	**Genetics**	-Definition of genetics -Important terms in genetics -Classification of genetic diseases	1	2
		Typical modes of genetic diseases inheritance with examples -Autosomal dominant inheritance Familial hypercholesterolemia - Autosomal recessive inheritance Phenylketonuria (PKU) Cystic Fibrosis -X-linked dominant inheritance Fragile X syndrome - X-linked recessive inheritance Duchenne and Becker muscular dystrophies -Y-linked inheritance Y chromosome infertility - Codominant inheritance Alpha-1 antitrypsin deficiency	3	6
		Atypical modes of genetic diseases inheritance - Mitochondrial inheritance -Genomic imprinting Prader-Willi syndrome -Moasicism -Uniparental Disomy	2	4

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		Beckwith-Wiedemann syndrome -Epigenetics		
4	Final Theoretical Exam	MCQs and essay questions	1	2
Number of Weeks /and Units Per Semester			16	32

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C. Tutorial Aspect:

No.	Tutorial	Number of Weeks	Contact Hours
1	None		
2			
Number of Weeks /and Units Per Semester			

VI. Teaching Strategies of the Course:

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VII. Assessment Methods of the Course:

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		Assignments	
1	**Searching** information about related subjects of molecular biology and genetics	5th	10
Total	10		

XI. Course Policies: (Based on the Uniform Students' Bylaw (2007)

1	**Class Attendance:**

	Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
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