

Course Syllabus

1	Course title	Diagnostic Genetics	
2	Course number	0308322	
3	Credit hours	3 (2 theory, 1 practical)	
	Contact hours (theory, practical)	2 theory, 3 practical / week	
4	Prerequisites/co-requisites	Molecular Biology	
5	Program title	Clinical Laboratory Sciences	
6	Program code	0308	
7	Awarding institution	The University of Jordan	
8	School	Science	
9	Department	Department of Clinical Laboratory Sciences	
10	Course level	3 rd Year	
11	Year of study and semester (s)	Fall 2023/ 2024	
12	Other department (s) involved in teaching the course		
13	Main teaching language	English	
14	Delivery method	<input type="checkbox"/> Face to face learning <input checked="" type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date	2/2024	

17 Course Coordinator:

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18 Other instructors:

Name:
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19 Course Description:

This course is divided into four parts. The first part covers Mendelian genetics, the molecular bases of Mendelian genetics and extensions of Mendelian genetics. The second part describes chromosome mapping, sex determination and sex chromosomes, and chromosome mutations. The third part describes the topics of extra nuclear inheritance, quantitative genetics, and multifactorial traits. Finally, the fourth part covers the molecular genetics of some popular human disorders, genetic testing in individuals and populations, human biochemical disorders, gene therapy, hereditary defects with altered drug responses, and genetic counselling. This course includes two lectures and one laboratory session, which includes experiments dealing with chromosomal analysis and other molecular genetics techniques such as RT-PCR, RFLP, FISH, CISH, and Fragment analysis.



20 Course aims and outcomes:

A- Aims:

This course aims to provide students with a solid foundation in genetics and molecular biology. It covers fundamental Mendelian genetics, molecular aspects, and extensions, along with advanced topics such as chromosome mapping, sex determination, and mutations. Students will also explore extra-nuclear inheritance, quantitative genetics, and multifactorial traits. The course further delves into practical applications, including the molecular genetics of human disorders, genetic testing, biochemical disorders, gene therapy, hereditary defects with altered drug responses, and genetic counseling. With two lectures and one laboratory session, students will gain hands-on experience with chromosomal analysis and molecular techniques like RT-PCR, RFLP, FISH, CISH, and Fragment analysis, fostering a comprehensive understanding of genetic principles and their real-world applications.

B- Students Learning Outcomes (SLOs):

For purposes of mapping the course SLOs to the Clinical Laboratory Sciences program SLOs, at the successful completion of the program, graduates are expected to be able to:

SLO(1). Understand and apply the theoretical foundations of medical laboratory sciences to accurately calibrate and operate advanced laboratory equipment.

SLO(2). Demonstrate knowledge of safety protocols, Ministry of Health regulations, and environmental preservation practices when handling samples of pathogens and chemical/biological risks.

SOL(3). Acquire in-depth technical knowledge to stay abreast of scientific advancements and actively participate in local and global applied research in the field.

SOL(4). Perform diverse analyses and effectively interpret results for various clinical samples across laboratory disciplines such as hematology, clinical chemistry, microbiology, urine analysis, body fluids, molecular diagnostics, and immunology.

SOL(5). Apply practical training to solve complex problems, troubleshoot issues, and interpret results, ensuring a connection between data and specific medical conditions for precise diagnosis.

SOL(6). Show effective communication skills to convey information accurately and appropriately in a laboratory setting.

SOL(7). Demonstrate a commitment to lifelong learning and innovation by applying modern techniques, critically analyzing information, and contributing to the creation and application of new knowledge in medical laboratory sciences which fulfil the requirements of national and international CBD.

SOL(8). Uphold professional behavior, ensuring the confidentiality of client information, and respecting client privacy throughout all aspects of laboratory work.

SOL(9). Apply managerial skills that align with quality assurance, accreditation, quality improvement, laboratory education, and resource management, showcasing competence in the effective administration of laboratory practices.

Descriptors	ILO/ID	Program SLOs				
		Course SLOs	SLO (1)	SLO (5)	SLO (7)	SLO (8)
Knowledge	A1	Recall foundational principles such as Mendelian genetics, molecular bases, and advanced topics like chromosome mapping and sex determination.	X			
	A2	Demonstrate an understanding of extra-nuclear inheritance, quantitative genetics, and the molecular aspects of human disorders, genetic testing, and biochemical disorders.	X			
Skills	B1	Apply genetic principles to solve problems, employing techniques like RT-PCR, RFLP, FISH, and CISH for chromosomal analysis.		X		
	B2	Analyze experimental results critically, connecting theoretical knowledge to practical applications in laboratory sessions.	X			
Competence	C1	Evaluate ethical considerations in genetic research, showcasing an awareness of responsible practices in genetic testing, gene therapy, and genetic counseling.				X
	C2	Create solutions based on genetic understanding, demonstrating competence in addressing real-world challenges related to human disorders and altered drug responses.			X	

21. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Introduction to Diagnostic genetics	A1, C1	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
	1.2	Introduction to Diagnostic genetics	A1, C1	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
2	2.1	Mendelian Inheritance	A1	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018

3	3.1	Mendelian Inheritance	A1	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
	3.2	Reproduction and chromosome transmission	A1, A2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
4	4.1	Extensions of mendelian inheritance	A1, A2	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
5	5.1	Extensions of mendelian inheritance	A1, A2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
6	6.1	Non-Mendelian Inheritance	A1, A2	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
7	7.1	Non-Mendelian Inheritance	A1, A2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
8	8.1	Genetic Linkage and Mapping in Eukaryotes	A1, A2	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
9	9.1	Genetic Linkage and Mapping in Eukaryotes	A1, A2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
10	10.1	Variation in chromosome structure and number	B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018

	10.2	Variation in chromosome structure and number	B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
11	11.1	Molecular basis of mutations	B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
	11.2	Molecular basis of mutations	B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
12	12.1	Biochemical basis of genetic disorder	C1, C2	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
13	13.1	Biochemical basis of genetic disorder	C1, C2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
	13.2	Genetic diseases	C2	Blended	Moodle	Asynchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
14	14.1	Genetic diseases	C2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Genetics: analysis & principles / 6th ed. Brooker, 2018
15	15.1	Revision		Blended	Moodle	Asynchronous	Quiz, Exam	
Practical Sessions								
1	1	Introduction to Diagnostic genetics	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
2	2	Pedigree analysis	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
3	3	Karyotyping	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3

4	4	Fluorescence In Situ Hybridization FISH	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
5	5	Chromogenic In Situ Hybridization CISH	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
6	6	DNA array	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
7	7	Real Time PCR 1	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
8	8	Real Time PCR 2	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
9	9	RFLP	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
10	10	DNA sequencing	B1,B2	Face to Face	Genetics Lab	Synchronous	Report, Quiz & Exam	Ref 1,2,3
11	11	Lab visit	C1, C2	Face to Face		Synchronous	Report, Quiz & Exam	
12	12	Lab visit	C1, C2	Face to Face		Synchronous	Report, Quiz & Exam	

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Quizzes	20		All SLOs	Every week	On campus
Lab Reports	10		All SLOs	Every week	
Second Exam or (Mid Exam)	30	Topics covered till week 7	A1, A2, C1	Week 8	On campus
Final Exam	40	All required chapters	All SLOs	Week 16	On campus



23 Course Requirements

Students are directed and encouraged to use all possible resources:

- use the internet as a learning source.
- a series of short movies is promoted
- students are encouraged to learn a suitable software package as a learning tool.

24 Course Policies:

A- Attendance policies:

Attend and participate in all classes: attendance will be taken.

Class time will be used to discuss, elaborate, expand, etc., on the written modules. This may include formal/informal lectures, audio visual presentations, demonstrations, labs, etc.

B- Absences from exams and handing in assignments on time:

- A student who has been absent for 15% or more of the total hours of any course, including absences for medical or compassionate reasons, may be required to withdraw from that particular course.
- Students who miss quizzes or examinations will automatically be assigned a mark of zero unless the respective instructor, or the Program Head, has been notified of the reason for absence *PRIOR* to the commencement of the exam. Acceptable reasons will be evaluated at the time (e.g., illness - medical certificate may be required, serious illness or death in the family, etc.). Supplemental examinations may be allowed in legitimate cases.

C- Health and safety procedures:

All students need to be immunized against hepatitis B, immunization certificate must be forwarded to the coordinator of the hospital training. Pregnancy affects immunization and it is the responsibility of the student to notify the health person as soon as possible of her pregnancy. If there are fees related to immunization, it is the responsibility of the student.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy:

Evaluation	Point %	Date
Assignments or Quizzes		
Midterm Exam	30%	Will be announced in due time.
Lab. Reports & Quizzes	30%	
Final Exam	40%	Will be announced in due time.



F- Available university services that support achievement in the course:

1. Molecular Biology & Genetics Labs.
2. The University Computer Lab.
3. The University Main Library.
4. The University e-library.

25 References:

A- Required book(s), assigned reading and audio-visuals:

1. Genetics: analysis & principles / 6th ed. Brooker, Robert J. 2018

B- Recommended books, materials, and media:

2. Human genetics: from molecules to medicine/ 1st ed. Christian Patrick Schaaf, Johannes Zschocke, Lorraine Potocki 2012
3. Clinical genetics/ 1st ed. Keya Lahiri Mamta N Muranjan, 2005

26 Additional information:

Name of Course Coordinator: **Dr. Ahmed Abu siniyeh**

Signature: *Ahmed Abu siniyeh* Date: 2-2024

Head of Curriculum Committee/Department: **Dr. Suzan Matar**

Signature: *Suzan Matar*

Head of Department: **Dr. Ahmed Abu siniyeh**

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Head of Curriculum Committee/Faculty: **Dr. Mu'ayyad Al Hseinat**

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Dean: **Prof. Mahmoud Jaghoub**

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