Course Syllabus
Advanced Diagnostic Microbiology (140501741)
Second Semester 2021 /2022

COURSE INFORMATION	
Course Name: Advanced Diagnostic Microbiology **Semester:** 2nd 2021/22 **Department:** Medical Laboratory Sciences **Faculty:** Applied Medical Sciences	**Course Code: 140501741** **Section:** **Core Curriculum**:
Day(s) and Time(s): Sunday 1100 - 1400 **Classroom:** Graduate studies classroom	**Credit Hours:** 3 **Prerequisites**: None

COURSE DESCRIPTION

Diagnostic microbiology field continues to undergo a quiet revolution that already has resulted in many benefits for microbiologists, clinicians, and most importantly patients. This revolution was initially made possible by the elucidation of the structure of DNA and the genetic code, which allowed scientific advances centered around hybridization probes, the polymerase chain reaction, genomics, transcriptomics, proteomics, and metabolomics. These technical advances in molecular microbiology over the first decade of the twenty-first century have profoundly altered every aspect of the clinical microbiology laboratory. This advanced course aims to provide a comprehensive, well-referenced, and up-to-date description of these rapidly evolving advanced methods for the diagnosis of infectious diseases in the routine clinical as well as research microbiology laboratory.

DELIVERY METHODS

The course will be delivered through a combination of active learning strategies. These will include:

- PowerPoint lectures and active classroom-based discussion
- Writing assignments

FACULTY INFORMATION

Name	**Lo'ai Alanagreh, PhD**
Academic Title:	**Assistant Professor of molecular microbiology**
Office Location:	**Department chairperson**
Telephone Number:	
Email Address:	**loai-alanagreh@hu.edu.jo**
Office Hours:	**Monday - Thursday 1100 – 1200** *Please send an e-mail (loai-alanagreh@hu.edu.jo) to meet at any other time.*

REFERENCES AND LEARNING RESOURCES

Required Textbook:

There is no required textbook for purchase. All compulsory weekly readings are available electronically on MS Teams

STUDENT LEARNING OUTCOMES MATRIX*

Core Curriculum Learning Outcomes	Course Objectives	Course Student Learning Outcomes	Assessment Method
Recognize how genetic tests are used to identify unknown organisms.	1. Learn the theory of PCR, how PCR primers are designed, and how to add desirable sequences to PCR products using primer modifications. 2. Learn the theory of RT-PCR 3. Understand how DNA sequencing can be used to identify microbes. 4. Understand the principles of probe-based microbial detection methods	1. Determine the appropriate tests to use for the identification of an unknown organism. 2. Use computer programs for bioinformatics analysis.	• Exams • "On-line' reading assignments • homework assignments •
Recognize the diversity of the genetic characteristics of microbes.	1. Understand how those characteristics are used to separate microbes into taxonomic groups. 2. Experience the simplicity of molecular techniques commonly used to modify genetic information.	Use genetic techniques to study and modify microbes.	• Exams • "On-line' reading assignments • homework assignments
Develop written communication skills	Recognize the importance of scientific writing and reading	Experience the process of science by writing a scientific term paper	homework assignments

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance*. It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism

Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**
- **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Late or Missed Assignments

In all cases of assessment, students who fails to attend an exam, class project or deliver a presentation on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

- Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.
- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with University regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment as listed below with their grade weighting taken into account. The criteria for grading are listed at the end of the syllabus

Assessment	Grade Weighting	Deadline Assessment
Mid-term exam	30%	
Term paper	15%	Add date/time
Presentation	15%	
Final Exam	40%	

Description of Exams

Test questions will predominately come from material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. Exam will consist of a combination of multiple choice, short answer, match, true and false and/or descriptive questions.

Homework: Will be given for each chapter, while the chapter in progress you are supposed to work on them continuously and submit in next lecture when I finish the chapter.
You are also expected to work on in-chapter examples, self-tests and representative number of end of chapter problems. The answers of self-tests and end of chapter exercises are given at the end of the book.

Quizzes: Unannounced quizzes will be given during or/and at the end of each chapter based upon the previous lectures. It will enforce that you come prepared to the class.

No make-up exams, homework or quizzes will be given. Only documented absences will be considered as per HU guidelines.

Grades are not negotiable and are awarded according to the following criteria*:

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

Week	Topics	Notes
1	Advanced diagnostic microbiology: An introduction	
2	Molecular microbiology: genetics and genomes	
3	Microbial DNA Technologies	
4	PCR and Its Variations Real-Time and Digital PCR for Nucleic Acid Quantification Multiplex PCR for Detection and Identification of Microbial Pathogens	
5	Detection and Characterization of Molecular Amplification Products: Agarose Gel Electrophoresis, Southern Blot Hybridization, Restriction Enzyme Digest Analysis, and Enzyme-Linked Immunoassay	
6	Molecular Typing Techniques: State of the Art	
7	Mid-term	
8	Nonamplified Probe-Based Microbial Detection and Identification	
9	Technical Advances in Diagnostic Microbiology	
10	Sequencing and Next-Generation Sequencing Metagenomic studies for Pathogen Detection and Identification	
11	Transcriptomic Techniques in Diagnostic Microbiology	
12	Advances in the Diagnosis of Mycobacterium tuberculosis Infection Sequencing and Next-Generation Sequencing Metagenomic studies for Pathogen Detection and Identification	
13	Recent Advances in Diagnostic Virology	
14	Presentations	
15	Presentations	
16		

ASSESSMENT RUBRICS

Assessment Rubrics to be determined by the department. Add samples below.

Classroom Participation: Oral Presentation										
Element	**Excellent**			**Satisfactory**			**Needs Improvement**			**Points**
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Organization	▪ There is a logical sequence of information. ▪ Title slide and closing slide are included appropriately.			▪ There is some logical sequence of information. ▪ Title slide and closing slides are included.			▪ There is little or no logical sequence of information. ▪ Title slide and/ or closing slides are not included.			
Slide Design (text, colors, background, illustrations, size, titles, subtitles)	▪ Presentation is attractive and appealing to viewers.			▪ Presentation is somewhat appealing to viewers.			▪ Little to no attempt has been made to make presentation appealing to viewers.			
Content	▪ Presentation covers topic completely and in depth. ▪ Information is clear, appropriate, and accurate.			▪ Presentation includes some essential information. ▪ Some information is somewhat confusing, incorrect, or flawed.			▪ Presentation includes little essential information. ▪ Information is confusing, inaccurate, or flawed.			
Language	▪ Spelling, grammar, usage, and punctuation are accurate ▪ Fluent and effective			▪ There are minor problems in spelling, grammar, usage, and/or punctuation.			▪ There are persistent errors in spelling, grammar, usage, and/or punctuation. ▪ Less or not fluent and effective.			
Delivery	▪ Ideas were communicated with enthusiasm, proper voice projection and clear delivery. ▪ There was sufficient eye contact with audience. ▪ There were sufficient use of other non-verbal communication skills. ▪ Appropriate delivery pace was used.			▪ There was some difficulty communicating ideas due to voice projection, lack of preparation, incomplete work, and/or insufficient eye contact. ▪ Insufficient use of non-verbal communication skills. ▪ Delivery pace is somewhat appropriate.			▪ There was great difficulty communicating ideas due to poor voice projection, lack of preparation, incomplete work, and/or little or no eye contact. ▪ No use of non verbal communication skills. ▪ Inappropriate delivery pace was used.			
Interaction with Audience	▪ Answers to questions are coherent and complete.			▪ Most answers to questions are coherent and complete.			▪ Answers to questions are neither coherent nor complete.			

	▪ Answers demonstrate confidence and extensive knowledge.	▪ Answers somehow demonstrate confidence and extensive knowledge.	▪ Is tentative or unclear in responses.	
	Total Score (Y x 5/16) =			