Introduction to Microbiology and lab Syllabus			
Course Title	Introduction to Microbiology and lab		
Course Code	MLS2405C	No. of Credits	4
Department	Medical Laboratory Science (MLS)	College	Science
Pre-requisites Course Code	Introduction to MLS MLS1200	Co-requisites Course Code	
Course Coordinator(s)	Dr. Belal A. Muhammad	Office No.	217
E-mail	belal.muhammad@komar.edu.iq	IP No.	
Other Course Teacher(s)/Tutor(s)	Mr. Alan Ahmed		
Learning Hours	**Theory:** Tuesday, Thursday (13:00 – 14:30), Room 113 **Lab:** Tuesday (15:00 – 18:00)		
Contact Hours	Per request		
Course Type	Departmental course		
Offered in Academic Year	Spring 2016		

COURSE DESCRIPTION

The theoretical part of Introduction to Microbiology course provides a comprehensive view of the microbial world and their relation to human. Topics include basic characteristics of bacteria, fungi, parasitic protozoa and viruses. Among all these microbes bacteria will be studied in more detail including bacterial cell structure, function, growth, physiology, genetics and pathogenicity. Special emphasis is placed on topics related to human's health such as host-pathogen interactions, human defense mechanisms, microbial pathogenicity and diseases.

The practical sessions of this course are designed to enable students receive efficient practical training about the proper usage of the microbiology lab, equipment, supplies, and materials. Lab excises are designed in way to reinforce the concepts of the theoretical lectures and together give a comprehensive knowledge to the students about all fundamental topics related to Microbiology. This course provides solid background needed for future courses in the field of microbiology within the MLS curriculum such as medical bacteriology, medical virology, and medical parasitology.

COURSE OBJECTIVES

This course is designed to:

- Familiarize students with the principles of microbiology, with an emphasis on microbial structure, function, growth, and their role in human diseases.
- Train students to properly use materials and supplies related to microbiology lab.

COURSE LEARNING OUTCOMES

After participating in this course, students would be able to:

Knowledge/comprehension (75%)

1. Understand and answer questions related to microbial world including cell components and function, classification and nomenclature, growth and physiology, genome and gene expression. (E)
2. Summarize the process of host-microbe interaction and the mechanisms of human defenses to infection. (E)
3. Express knowledge about the basic concepts, medical significance, and common microbial infectious diseases caused by different types of microbes including bacteria, fungi, viruses, and parasitic protozoa. (E)

Application (25%)

4. Practice the methods of safety conduct and antiseptic techniques in the modern microbiological laboratories. (A, B)
5. Set and conduct experiments related to microbiological laboratories with a proper usage of laboratory equipment and supplies. (E, F)
6. Interpret the results of the experiments and evaluate their accuracy. (F)

GUIDELINES ON GRADING POLICY

Points	*Percentage Scores*	*Grade*
A	*95–100*	*4.0*
A-	*90-94*	*3.7*
B+	*87–89*	*3.3*
B	*83-86*	*3.0*
B-	*80-82*	*2.7*
C+	*75–79*	*2.3*
C	*70-74*	*2.0*
C-	*65-69*	*1.7*
D+	*60–64*	*1.3*
D	*55-59*	*1.0*
D-	*50-54*	*0.7*
F	*0–49*	*0*
I	*Incomplete Course Work*	
W	*Official Withdrawal*	

Note: The Passing Grade is 65%

COURSE CONTENT

Course topics include:

1. Introduction to the science of microbiology.
2. The biology of prokaryotes.
3. Microbial genetics
4. Principles of the immune response and immune disorders.
5. Microorganisms and disease.
6. Intro to Mycology
7. Intro to Virology
8. Intro to Parasitic protozoa.
9. Overview of infectious diseases.
10. Twelve exercises covering different topics of microbiology laboratory.

COURSE REQUIREMENTS

1. Hard copies of theoretical Lectures and Laboratory manual.
2. Making notes about what will be discussed in class/lab.
3. Reading the indicated chapters of the designated textbook for this course.
4. Wearing lab coats and following all laboratory safety rules and guidelines while working in the lab.

COURSE TEACHING AND LEARNING ACTIVITIES

The theoretical part of this course is scheduled for 3 hrs/week in two equal split over 2 different days.

The lab components will be taught one time per week where students can spend up to 3 hours in lab. Reports will be collected and a quiz will be done within the first 10-15 minutes of the lab session then the instructor will spend about an hour to explain the idea, principle, and procedure of the experiment. A complete semester is composed of 15 instructional weeks (excluding one week of Mid-term exams) followed by a final exam period. Instructional methods will include:

- Lectures and lab manual.

- Class/lab discussions and presentations.
- Written activities.
- PowerPoint presentations, animations, and Videos.
- Online learning materials and tools.

COURSE ASSESSMENT TOOLS

Assessment Tools	Description	Weight
Quizzes (5)	Students will take 7 quizzes over the course and the highest 5 quiz marks will be counted toward the final grade.	**10%**
Class activities	Student's attendance and participation during the lecture including lecture presentation, asking/answering question, etc will be considered and awarded throughout the course.	**5%**
Mid-term Exam	There will be no classes during this week. Students will take a central Mid-term Exam organized and supervised by the Exam committee. The Exam may include definitions, filling blanks, multiple-choices, true/false, short answers, enumerations, illustrations, etc	**20%**
Tests (2)	During the course schedule, students will take 2 tests, one before and one after the Mid-term Exam. The test may include definitions, filling blanks, multiple-choices, true/false, short answers, illustrations, etc	**10%**
Laboratory work	Laboratory topics and experiments are coordinated in a way to complete each other and to reinforce the concepts introduced in lecture portion. Topics, assessment tolls, and other information related to the lab is presented at the end of this document.	**25%**
Final Exam	The exam will be close book and no materials are allowed, except those permitted by the exam committee. All materials taught during the course is required for the final Exam.	**30%**

ESSENTIAL READINGS: (Journals, textbooks, website addresses etc.)

Textbooks:

Engelkirk, P. G., and Duben-Engelkirk J., *Burton's Microbiology for the Health Sciences*., 9th ed. 2011, Lippincott, Williams & Wilkins. 445 p.

References:

- **Brooks, G.F., et al.,** *Jawetz, Melnick, and Adelberg's medical microbiology*. 25th ed. 2010, New York: Lange Medical Books/McGraw-Hill, Medical Pub. Division. 784p.
- **Kayser, F.H. and Beall M.,** *Medical Microbiology*. 2005, George Thieme Verlag, Thieme Medical Publishers: Stuttgart, New York. 727 p.
- **Online resources:**
  Todars Online Textbook of Bacteriology, http://textbookofbacteriology.net/
- **References for the lab sessions are provided in the lab manual.**

COURSE POLICY (including plagiarism, academic honesty, attendance etc)

Any kind of dishonesty and/or plagiarism is not acceptable and will be dealt with according to the KUST's Academic Policy available on
http://sar.komar.edu.iq/files/Student%20hand%20Book%202013.pdf

Attendance:

- Students are expected to attend **all lectures** and must attend **all tests/examinations**, quizzes, and **practical exercises**.
- There is no make-up work for students who miss classes without official permission.
- Students who have official permission must arrange with the instructor to make-up the missed class/lab/test.
- Students are subject to the regulation and policies mentioned in the KUST Student Handbook.
- KUST guidelines for lateness are as follows: **Three occasions of lateness count as one absence. You can be considered late after 5 minutes of the lecture time. More than 5 minutes lateness can be considered as absent** but you may still be allowed to sit in the class.

GUIDELINES FOR SUCCESS

The following points are essential for a successful outcome:

1. **Work/Class attitude:** Work both independently and in group.
2. **Classroom/lab habit:**
   - ❖ Pay your full attention to the instructor.
     Ask question whenever you do not understand. **DO NOT BE SHY.**
   - ❖ Read the experiments in your manual before you attend the lab and don't depend on your mate to explain the experiment steps for you.
   - ❖ Follow up the results of your exercise and collect the data on time, this will help you write and submit your report in a proper way.
3. **Studying habit:** Try to **understand** first and then memorize if required. Reviewing your lectures on your own after and before attending the class will help you keep the information for a longer time.
4. **Tasks and duties:** Perform your tasks on time. Writing assays, doing homeworks, preparing reports, etc will help you to master your course.
5. **Punctuality:** attend all lectures on time, missed class can't be substituted even if you do a make-up!

CELL PHONES

All cell phones and beepers are expected to be switched to vibrating mode if available and turned off completely if this feature is not an option. Disruption of class due to beepers or a cell phone will not be tolerated and the student may be asked to leave the class. All other electronic equipment that the faculty member deems not essential to the provision of academic learning is prohibited from being used in class.

REVISION TO THE SYLLABUS

This syllabus is subject to slight changes. It is the duty of the instructor to inform the students about the changes in a timely fashion after approval of Quality Assurance Office (QAO).

Course calendar: Please check the academic calendar for spring 2016 on OSAR's website
https://docs.google.com/a/komar.edu.iq/viewer?a=v&pid=sites&srcid=a29tYXIuZWR1LmlxfG9zYXJ8Z3g6MTA1MmU2Mjk0NDM0ZTc0ZQ

Introduction to Microbiology_Theory schedule Spring 2016					
Week	**Lec**	**Topics**	**Reading Chaps**	**Activities**	**Related CLOs**
W1	**1**	**Introduction to Microbiology:** Historical background What is Microbiology and why we study it?	**1**		**1**
	2	Viewing Microbial world (Types of Microscopes)	**2**		
W2	**3**	Control of microbial growth in vitro Methods of sterilization and disinfection	**8**	**Quiz 1** Lec 1 & 2	**1**
	4	Microbial Taxonomy and nomenclature	**3**		
W3	**5**	**The biology of Prokaryotes:** Prokaryotic cell structure and function I	**3**	**Quiz 2** Lec 3 & 4	**1**
	6	Prokaryotic cell structure and function II			
		Nawroz Holiday (20 – 24 /3/2016)			
W4	**7**	**Test I: Lecs. 1-6**		**No Class**	**1**
	8	Microbial growth and physiology I (Nutrition and Metabolism)	**7**		**1**
W5	**9**	Microbial growth and physiology II (Conept of Growth, Generation Time, Growth Curve)	**8**		**1**
	10	Microbial growth and physiology III (Factors Affecting Micribial Growth)			
W6	**11**	**Microbial genetics:** DNA replication transcription & translation I	**6 & 7**	**Quiz 3,** Lec 8-10	**1**
	12	DNA replication transcription & translation II			
W7	**13**	**Principles of the immune response and immune disorders:** Nonspecific host defence mechanisms	**15**	**Quiz 4** Lec 11 & 12	**2**
	14	Specific host defence mechanisms	**16**		
		Mid-term Exam: Lecs 1- 14			**1 & 2**
W8	**15**	**Microorganisms and disease:** Pathogenic microbes vs normal flora	**10 & 14**		**2**
	16	Microbial infection and terminology			
W9	**17**	Host-pathogen interactions	**10 & 14**	**Quiz 5** Lec 15 & 16	**2**
	18	Factors involved in pathogenicity (virulence factors)			
W10	**19**	Control of microbial growth in vivo	**9**		**1 & 2**
	20	**Test II: Lecs. 15-19**		**No Class**	**1 & 2**
W11	**21**	**Intro to Virology:** Basic concepts	**4 & 18**		**3**
	22	Medical significance of viruses			
W12	**23**	**Intro to Mycology:** Basic concepts	**4 & 20**		**3**
	24	Medical significance of fungi			
W13	**25**	**Intro to Parasitic Protozoa:** Basic concepts	**4 & 21**	**Quiz 6** Lec 21 - 24	**3**
	26	Medical significance of parasitic protozoa			
W14	**27**	**Overview of infectious diseases I**	**17**	**Quiz 7** Lec 25 & 26	**3**
	28	**Overview of infectious diseases II**			
W15		**Revision**			**1, 2, 3**

LAB ASSESSMENT TOOLS		
Assessment Tool	**Description**	**Weight**
Quizzes (5)	Students will take more than 5 quizzes but the highest 5 quiz's grades will be counted toward their final lab grade.	5%
Lab reports (9)	Students will submit a report for each lab or two related labs as indicated in the schedule. All the reports will be counted toward the final lab grade.	9%
Technical work	Students will be evaluated based on their technical performance in the lab. Several points will be considered including application of safety rules and guidelines, work quality and attitude, following up the results, tidiness, etc	4%
Final test	One test will be conducted at the end of the semester. The test may include microscope slide preparation/identification, multiple-choice questions, labeling of figures, short answers, problem solving etc	7%
Total		**25%**

Introduction to Microbiology_Lab schedule Spring 2016			
Week	**Topics**	**Activities**	**Related CLOs**
1	**Orientation to the Microbiology Laboratory** General Microbiological instruments and equipment Lab report preparation and submission	No lab work	**4**
2	**Exercise 1: Antiseptic Techniques** Sterilization, Disinfection, and Antisepsis		**4 & 5**
3	**Exercise 2: Microscopic Techniques I:** Wet-Mount Preparations	**Quiz 1, Ex. 1** ***Lab Report 1, Ex. 1***	**4, 5, 6**
	Nawroz Holiday (20 – 24 /3/2016)		
4	**Exercise 3: Microscopic Techniques II:** Simple Staining and Smear Preparation	**Quiz 2, *Ex. 2***	**4, 5, 6**
5	**Exercise 4: Differential staining I:** Gram Stain	***Lab Report 2, Ex. 2 & 3***	**4, 5, 6**
6	**Exercise 5: Differential staining II:** Acid-Fast Stain	**Quiz 3, *Ex. 4***	**4, 5, 6**
7	**Exercise 6: Special Stains:** Endospore, Capsule Staining	***Lab Report 3, Ex. 4 & 5***	**4, 5, 6**
	Midterm Exam	**NO Lab**	**4, 5, 6**
8	**Exercise 7: Microbiological Culture Media Preparation and Sterilization:** Culture Media	***Lab Report 4, Ex. 6***	**4, 5, 6**
9	**Exercise 8: Culturing and Isolation Techniques I:** Spread- and Streak-Plate Techniques	**Quiz 4, *Ex. 7*** ***Lab Report 5, Ex. 7***	**4, 5, 6**
10	**Exercise 9: Culturing and Isolation Techniques II:** Pour-Plate Technique	**Quiz 5, *Ex. 8***	**4, 5, 6**
11	**Exercise 10: Determination of Bacterial Numbers** Standard Plate Count and Spectrophotometric analysis	***Lab Report 6, Ex. 8 & 9***	**4, 5, 6**
12	**Exercise 11: Determination of a Bacterial Growth Curve:** Classical and Two-Hour Methods	**Quiz 6, *Ex. 10*** ***Lab Report 7, Ex. 10***	**4, 5, 6**
13	**Exercise 12: Antimicrobial susceptibility test:** Disk agar diffusion method (Kirby-Bauer method)	***Lab Report 8, Ex. 11*** ***Lab Report 9, Ex. 12***	**4, 5, 6**
14	**Final Test: All Exercises**		**4, 5, 6**