SYLLABUS

Course Code	*Course Num.*	*Course Name*	*Credit Hours*	*Lec.*	*Lab.*	*Tut.*	*Private study*	*Pre-requisites*	*Course Level*	*Language*
BIO	**242**	**Bacteriology**	**4**	**3**	**2**	**0**	**6**	**General Microbiology BIO241**	**4**	**English**

A. Instructor information

Name and E-mail	Office phone	Office location	Office hour
Dr Marwa Yousry Abdel Monem Mymohamed@imamu.edu.sa om	----	Building: 323 Level: 4 Room: A444	Sun: 9 A.M.-10 A.M Sun:1 p.M- 2 P.M. Wed:1 p.M- 2 P.M.

B. Course Description:

The course covers the fundamental principles related to bacteria mainly of bacterial organisation importance and their interaction with host cells and molecular events during their replication.

C. Course Outcomes: At the end of this course the student is able to:

Knowledge:

- To list the general characteristics of bacteria and how to study them and to define the growth, metabolism and genetics of bacteria.
- To outline the pathogen-host relationship and the various factors that affects it.
- To state how specific bacterial pathogens interact with their host to cause disease.

Cognitive skills:

- To develop a knowledge base of principles of microbial taxonomy, structure, physiology and function.
- To demonstrate the ability to use the laboratory to diagnose infections, including appropriate specimen collection and test ordering.

Interpersonal Skills & Responsibility:

- To demonstrate the ability to interpret laboratory findings in the context of the patient's presentation and findings.
- To summarize correlation among the different branches of microbiology.

Communication, Information Technology, Numerical:

- To illustrate the ability to communicate their ideas with the instructor at all times during and after the class to operate laboratory instruments and computers.
- To demonstrate ability to use mail and Network in communicating with the others and in submitting home works and assignments.

Psychomotor:

- To employ safety measures during laboratory sessions.
- To demonstrate the different types of microorganisms.

D. References:

- **Required Textbook:**

- **Salle A. J. (2007):** Fundamental Principles of Bacteriology, Even press, ISBN-10: 1406707376, ISBN-13: 978-1406707373.
- **Ted R. (2015): J**ohnson. Laboratory Experiments in Microbiology 11th ed.,ISBN-13: 978-0321994936.

- **Other references:**

- **Dubey, R.C. and D.K. Maheswari, (2010):** A Text book of Microbiology. 3rd Edition, S. Chand and Company, New Delhi.
- **Benson, H.J.,(2002): Microbiological Applications:** Laboratory Manual in General Microbiology, 8 th Ed. New York, NY: McGraw-Hill.
- **Cappucino, J.G. and N. Sherman,(2001).** Microbiology - A Laboratory Manual. 6 th Edition, Benjamin Cummings, New York.

E. Topic outline:

E.1. Lectures:

List of Topics	Contact hours
• Cell organization • Cell size, shape and arrangement, glycocalyx, capsule, flagella, endoflagella, fimbriae and pili. Cell-wall: Composition and detailed structure of gram positive and gram-negative cell walls, Archaebacterial cell wall, Gram and acid fast staining mechanisms, lipopolysaccharide (LPS), sphaeroplasts, protoplasts, and L-forms. Effect of antibiotics and enzymes on the cell wall.	3
• Cell Membrane: • Structure, function and chemical composition of bacterial and archaeal cell membranes.	3
• Cytoplasm: • Ribosomes, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids	3
• Endospore • Structure, formation, stages of sporulation.	3
• Bacteriological techniques. • Pure culture isolation: Streaking, serial dilution and plating methods; cultivation, maintenance and preservation/stocking of pure cultures; cultivation of anaerobic bacteria, and accessing non-culturable bacteria.	3

• Growth and nutrition. • Nutritional requirements in bacteria and nutritional categories.	3
• Culture media • components of media, natural and synthetic media, chemically defined media, complex media, selective, differential, indicator, enriched and enrichment media .	3
• Sterilization and Disinfection. • Physical methods of microbial control: heat, low temperature, high pressure, filtration, desiccation, osmotic pressure, radiation Chemical methods of microbial control: disinfectants, types and mode of action.	3
• Reproduction in Bacteria. • Asexual methods of reproduction, logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate.	3
• Bacterial Systematics. • Aim and principles of classification, systematics and taxonomy, concept of species, taxa, strain; conventional, molecular and recent approaches to polyphasic bacterial taxonomy, evolutionary chronometers, rRNA oligonucleotide sequencing, signature sequences, and protein sequences. Differences between eubacteria and archaebacteria.	3
• Important archaeal and eubacterial groups. • According to Bergey's Manual of Systematic Bacteriology (Second Edition) • Archaebacteria: • General characteristics, phylogenetic overview, genera belonging to Nanoarchaeota (Nanoarchaeum), Crenarchaeota (Sulfolobus, Thermoproteus) and Euryarchaeota. [Methanogens (Methanobacterium, Methanocaldococcus), thermophiles (Thermococcus, Pyrococcus, Thermoplasma), and Halophiles (Halobacterium, Halococcus).	3

• Eubacteria • Morphology, metabolism, ecological significance and economic importance of following groups. • Gram Negative: • Non proteobacteria Aquifex, Thermotoga, Deinococcus, Thermus, Chlorobium, Chloroflexus, Chlamydiae, Spirochaetes.. • Alpha proteobacteria Rickettsia, Coxiella, Caulobacter, Rhizobium, Hyphomicrobium, Agrobacterium.. • Beta proteobacteria Neisseria, Burkholderia, Thiobacillus • Gamma proteobacteria Enterobacteriaceae family, Purple sulphur bacteria, Pseudomonas, Vibrio, Beggiatoa, Methylococcus, Haemophilus. • Delta proteobacteria Bdellovibrio, Myxococcus • Epsilon proteobacteria Helicobacter, Campylobacter	6
• Gram Positive: • Low G+ C (Firmicutes) Mycoplasmas, Clostridium, Heliobacterium, Lactobacillus, Lactococcus, Staphylococcus, Streptococcus, Leuconostoc, Bacillus. • High G+C (Actinobacteria) Arthrobacter, Bifidobacterium, Corynebacterium, Frankia, Mycobacterium, Nocardia, Streptomyces, Thermomonospora, Propionibacterium.	3
• Cyanobacteria. • Revision.	3

E.1. Laboratories:

Lab No.	Topics	Contact hours
Lab 01	Introduction Supply drawer check in General Lab rules and instructions.	2
Lab 02	Simple staining.	2
Lab 03	Negative staining	2
Lab 04	Gram's staining.	2
Lab 05	Acid fast staining-permanent slide only.	2
Lab 06	Capsule staining.	2
Lab 07	Spore staining.	2
Lab 08	Preparation of different media: synthetic media BG-11, Complex media-nutrient agar, Mc- Conkey agar, EMB agar.	2
Lab 09	Isolation of pure cultures of bacteria by streaking method.	2

Lab 10	Estimation of CFU count by spread plate method.	2
Lab 11	Motility by hanging drop method.	2
Lab 12,13	Some Physiological Tests.	2
Lab 14	Control of Microbial Growth.	2
Lab 15	Revision.	2

F. Office Hours:

Office hours give students the opportunity to ask in- depth questions and to explore points of confusion or interest that cannot be fully addressed in class

G. Exams & Grading System:

The semi-official dates of the exams for this course are:

Assessment task	Week Due	Proportion of Total Assessment
Midterm 1	Around 6th -7th week	15 %
Midterm 2	Around 11th -12th week	15 %
Quizzes, attendance, participation, home works	All the semester	10 %
lab reports	All the semester	5%
Lab exam.	Around 15th week	15%
Final exam.	Around 15th -16th week	40%
Total		100 %

Your course grade will be based on Final Exam, Midterms, Homework, Quizzes, Participation, Attendance and Project.

The grading distribution (the lowest passing grade is "D")

A+	A	B+	B	C+	C	D+	D	F
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 70)	70, 75)	[70, 65)	[60, 65)	[0, 60)

H. Student Workload

#	Teaching/Learning activities	Contact hours	Frequency	Total contact hours	Self-study hours	Total Self-study hours	Student learning time
5	**Lecture**	3	15	45	2	30	75
2	**Tutorial**	0	0	0	0	0	0
0	**Lab/ practical**	2	15	30	1	15	45
5	**Home work**	0	4	0	2	8	8
4	**Quiz**	0.5	2	1	1	2	3
6	**Midterm**	1.5	2	3	5	10	13
7	**FinalExam**	2	1	2	12	12	14
Total				**81**		**77**	**158**

The independent self-study is approximately 5 hours per week

I. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. ("Immediate family" is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

Executive Rules for Study Regulations and Exams
goo.gl/ykm7t3

Google Classroom Webpage: http://www.imamm.org/