BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
AUGS/ AGSR Division

SECOND SEMESTER 2018-19
COURSE HANDOUT

Date: 07.01.2021

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

Course No : **PHA F213**
Course Title : **Microbiology**
Instructor-in-Charge : **Dr. Aniruddha Roy**
Instructor(s) :
Tutorial/Practical Instructors:

1. Course Description: This course will provide an introduction to the study of microorganisms, their classification, structure and physiology, genetics, factors affecting growth, techniques of cultivation and isolation, mechanisms for their control, interactions with humans, their role in disease and immunity and tests for sterility and antimicrobial inhibition.

Laboratory sessions include basic techniques for culturing and identifying microorganisms, observing the effect of various factors on their growth, sterilization techniques, evaluation of disinfectants and antimicrobial screening.

2. Scope and Objective of the Course:

At the end of the course, the student will

- ✓ Be familiar with microbial diversity
- ✓ Characterize bacteria and viruses
- ✓ Have an understanding of microbial growth, factors affecting growth, techniques for isolation and cultivation of microorganisms.
- ✓ Have an understanding of physical and chemical methods for controlling or preventing bacterial growth.
- ✓ Describe the bacterial mechanisms of gene exchange.
- ✓ Have an understanding of physical and chemical methods for controlling or preventing bacterial growth.
- ✓ Discuss mechanisms of microbial pathogenicity and host resistance to microbes.
- ✓ Able to use appropriate aseptic techniques, microscopy, and biochemical testing to identify unknown bacteria.

3. Text Books:

Microbiology: An Introduction [Ninth edition] by Tortora, Funke and Case, 2006,
Publishers: PEARSON Benjamin Cummings.

4. Reference Books:

1. Pharmaceutical Microbiology, Hugo & Russel, Blackwell Publishing, 6th/ 7th Ed. 2005.
2. Tutorial Pharmacy, Cooper & Gunn's 6th Edition, CBS Publishers, 2000.
3. Microbiology a Laboratory Manual: J.G. Cappuccino & N.Sherman,1983, Addison-Wesley Publishing Company, Reading Massachuttes.

5. Course Plan:

Lect. No.	Topics to be covered	Learning Objectives	Reference Chapter # (Books)
1-2	Introduction, importance and classification of microorganismes. Staining techniques.	The science of microbiology	3 (TB)
3-6	Structure and function in general	Prokaryotic and eukaryotic cells	4 TB
7-9	Media requirements, culture media, growth curve, preserving bacterial culture, obtaining pure culture etc.	Microbial growth	6 (TB)
10-13	The ultimate parasites, classification of viruses, bacteriophages & animal viruses	The viruses	13 (TB)
14-15	The way microorganisms die, physical controls on microorganisms	Sterilization techniques	7 (TB)
16-18	Chemical controls on Microorganisms, examples of chemicals, mechanism of action and their evaluation	Antiseptics , disinfectants and preservatives	7 (TB) & 30(RB 2)
19-20	Introduction of genetic material & genetic exchange among microorganisms	Microbial Genetics	8 (TB)
21-25	Nonspecific defenses & specific defenses	Defending the body's interior	16, 17 (TB)
26-30	Microbial diseases of Skin, CNS, RT, GIT, immune system etc.	Disorders associated with various systems	19, 21-26 (TB)
31-34	Medicinally important microorganisms , Targets of antimicrobial drugs, Classification with structures, mechanism of action etc.	Antimicrobial drugs	3-6 (RB 1) & 20 (TB)
35-37	Production of antibiotics and Vaccines etc.	Applied microbiology	32 & 33 (RB 2)
38-40	Sterility testing, pyrogen testing, Evaluation/screening of antimicrobial drugs (*in-vitro* and *in vivo*)	Miscellaneous	23 (RB 1) & Class notes

b) *Lab Components:* [List of experiments to be done]

Expt. No. 01. Introduction and applications of microbiology
Expt. No. 02. Preparation and sterilization of culture media.
Expt. No. 03. Isolating Pure Culture from mixed culture by Streak-Plate Method
Expt. No. 04. Isolating Pure Culture from mixed culture by Pour-Plate Method
Expt. No. 05. Isolating Pure Culture from mixed culture by Spread-Plate Method
Expt. No. 06. Factors influencing growth of micro-organisms: Effect of ultra temperature and pH of media on growth of bacteria
Expt. No. 07. Factors influencing growth of micro-organisms: Effect of ultraviolet light and osmotic pressure on bacterial growth.
Expt. No. 08. To perform differential staining for given bacterial culture by Gram staining technique.
Expt. No. 09. To perform differential staining for given bacterial culture by Acid Fast staining technique.
Expt. No. 10. Determination of bacterial motility using hanging drop method
Expt. No. 11. To determine antimicrobial activity of given antibacterial agents (antibiotics) by zone of inhibition technique.

6. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of component (Close Book/ Open Book)
Mid-Semester Test	90 Min.	30	<TEST_1>	CB
Comprehensive Examination	3 h	40	<TEST_C>	OB + CB
Surprise quiz (s)	10 min	15	During semester	CB
Lab components[$]	-	15	Lab hours	

* Surprise tests will be conducted during class/tutorials on the basis of topics covered in class
[$] Weightage of lab components : Day to day Work - 5%; Viva (continious) - 2.5%; Lab compre Quiz - 5%; Viva (Compre) - 2.5%

7. Chamber Consultation Hour: To be announced in the class.

8. Notices: Notices concerning the course will be displayed on the Notice Board of the Pharmacy Department.

9. Make-up policy: Generally make-up will be considered for regular students only (80% attendance IN LECTURE CLASSES). Prior approval or intimation to take a make-up is a must. It is solely the discretion of the instructor-in-charge, depending upon the genuineness of the circumstances, to allow a student to appear for a make-up evaluation component.

Instructor-in-charge
Course No. PHA F213