BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
INSTRUCTION DIVISION
FIRST SEMESTER 2015-16

Dated:03.08.2015

Course Handout (Part-II)

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. : BIO F212
Course Title : Microbiology
Instructor In-charge : JITENDRA PANWAR
Team of Instructors : Prabhat Nath Jha, Arpit Bhargava, Gagandeep Singh Saggu, R.V. Dilip

1. Course Description: Introduction and classification of microbes; structure, physiology and genetics of microbial cell; isolation, cultivation, physiological and biochemical characterization of microbes; host parasite relationship; microbiology of soil, water and food; physical chemical methods of controlling microbes; antimicrobial drugs; clinical microbiology; and related lab components.

2. Scope & Objective of the Course: This course deals with the structure, physiology, genetics and growth of various microorganisms as well as their control. Emphasis will be given on microbes and their role in human health, environment and industry.

3. Text Book (TB):

Tortora, G.J., Funke, B.R. and Case, C.L. 2007. Microbiology: An Introduction, 9th Ed. (First Impression 2008), Pearson Education, India.

4. Reference Book (RB):

Willey, J.M., Sherwood, L.M. and Woolverton, C.J. 2008. Prescott, Harley and Klein's Microbiology, 7th Edition, McGraw Hill, India.

5. Lab Manual:

Experimental write-ups.

6. Course Plan:

Lec. No.	Learning Objectives	Topic to be covered	Ref. to Chapters
1-2	Introduction to microbiology	The microbial world	TB-1, RB-1
3-4	Methods in Microbiology	Microscopy and Specimen preparation	TB-3, RB-2
5-6	Methods in Microbiology	Requirement for growth, obtaining pure cultures and maintenance	TB-6, RB-5
7-10	Study of Microbial Structures	The morphology & fine structure of bacteria	TB-4, RB-3
11-13	Study of Microbial Structures	Eukaryotic microorganisms	TB-12, RB-4
14-16	The Microorganisms	The characterization, classification and identification of microorganism	TB-10,RB-19
17-19	Virology	Virus, Viroids, Prions	TB-13, RB-16,17,18
20-22	Microbial Growth	Growth of Microbes and its measurement	TB-6, RB-6

23-25	Microbial Physiology	Microbial metabolism	TB-5, RB-8,9,10
26-28	Control of Microorganism	Physical and chemical methods of microbial control, Antimicrobial drugs	TB-7, 20 RB-7
29-32	Microbial Genetics	The genetics of microorganisms	TB-8, RB-11,12,13
33-35	Clinical Microbiology	Principles of diseases and epidemiology, Microbial Mechanisms of Pathogenicity	TB-14, 15
36-38	Environmental Microbiology	Microbiology of soil, domestic and waste water	TB-27 RB-27,29,41
39-41	Applied Microbiology	Microbiology of food and Industrial microbiology	TB-28 RB-40,41

7. Portions for self-study:

To be announced in class from time to time.

8. Lab Component:

PART 1: Basics

Exp 1.1: Introduction to microbiology laboratory and practices

PART 2: Bacterial isolation, identification and maintenance

Exp 2.1: Isolation of pure cultures of bacteria from various samples and cell count
Exp 2.2: Gram's staining of bacteria
Exp 2.3: Preparation of glycerol stock for long term preservation
Exp 2.4: IMViC test for biochemical characterization of bacteria
Exp 2.5: Test of hydrolytic enzymes (pectinase, cellulase, amylase, protease) in bacteria
Exp 2.6: Fluorogenic detection of *E. coli*

PART 3: Microbial population

Exp 3.1: Coliform counts in contaminated water sample
Exp 3.2: Dehydrogenase activity assay for qualitative determination of microbial population
Exp 3.3: Enumeration of microbial cells in air microflora

PART 4: Abiotic and biotic Factors

Exp 4.1: Bacterial growth curve
Exp 4.2: Effect of pH, temperature, salt and radiation on growth of microorganisms
Exp 4.3: Effect of various antibiotics on microbial growth
Exp 4.4: Effect of various metals on microbial growth

PART 5: Fungal microbiology

Exp 5.1: Isolation of pure cultures of fungus
Exp 5.2: Staining of fungus- Lactophenol cotton blue staining
Exp 5.3: Study of extracelluar hydrolytic enzymes (pectinase, cellulase, amylase, protease) in fungi
Exp 5.4: Determination of size of fungal spore using micrometry
Exp 5.5: Isolation of arbuscular mycorrhizal fungi from rhizospheric soil samples
Exp 5.6: Production of citric acid from fungus using laboratory fermentor

Note: *Out of the above mentioned list, a maximum of 12 experiments will be conducted in the Semester as per the availability of the consumables.*

9. Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage (%)	Date, Time & Venue	Remarks
1.	Mid-Semester Test	90 min	20	8/10 2:00 - 3:30 PM	CB
2.	Quiz/Assignments		10		
3.	Laboratory evaluation		30		
4.	Comprehensive	3 hours	40	9/12 FN	CB/OB

10. Chamber consultation hour: To be announced in the class.

11. Notices: All notices will be displayed on the notice board of Department of Biological Sciences.

12. Make-up policy: Make-up decisions will be made on a case-by-case basis and only genuine cases as determined by the team and validated by Wardens and/or Medical Officer will be considered. No make-ups for Lab component and Quizzes.

Instructor-in-charge
BIO F212