Title Summary for B.Sc. Microbiology Syllabus
(Effective from June 2017)

Semester	Paper	Title
I	MB 01	**INTRODUCTION TO MICROBIOLOGY**
	MB 02	**BACTERIAL AND ARCHEAL CELL STRUCTURE AND FUNCTION**
	MBP 01	PRACTICALS – SEMESTER I
II	MB 03	**MICROBIAL NUTRITION AND GROWTH**
	MB 04	**BIOMOLECULES OF MICROORGANISMS**
	MBP 02	PRACTICALS – SEMESTER II
III	MB 05	**MICROBIAL CONTROL**
	MB 06	**ENZYMOLOGY**
	MB 07	**PRINCIPLES OF VIROLOGY**
	MBP 03	PRACTICALS – SEMESTER III
IV	MB 08	**BACTERIAL TAXONOMY**
	MB 09	**MICROBIAL PHYSIOLOGY**
	MB 10	**MICROBIOLOGY OF ECOSYSTEMS**
	MBP 04	PRACTICALS – SEMESTER IV
V	MB 11	**BACTERIAL GENETICS**
	MB 12	**EUCARYOTIC TAXONOMY**
	MB 13	**RECOMBINANT DNA TECHNOLOGY**
	MB 14	**FUNDAMENTALS OF IMMUNOLOGY**
	MB 15	**MICROBIAL PATHOGENICITY AND DISEASES**
	MB 16	**MICROBIOLOGY OF ENVIRONMENT**
	MBP 05	PRACTICALS – SEMESTER V
VI	MB 17	**FOOD AND DAIRY MICROBIOLOGY**
	MB 18	**PRINCIPLES OF FERMENTATION TECHNOLOGY**
	MB 19	**ECONOMIC MICROBIOLOGY**
	MB 20	**BIOINFORMATICS**
	MB 21	**CLINICAL MICROBIOLOGY**
	MB 22	**HAEMATOLOGY**
	MBP 06	PRACTICALS – SEMESTER VI

F.Y.B.Sc. Semester I

MB: 01 INTRODUCTION TO MICROBIOLOGY

	UNIT 1	**MICROBIOLOGY AND ITS ORIGIN**	
	Reference: Prescott 9th	**Teaching Duration:**	**Lectures 10**
1.1	Microscopy and discovery of microorganisms		
1.2	Culture based methods of studying microorganisms		
1.3	Microorganisms and disease		
1.4	Koch's postulate		
1.5	Pure culture methods		
1.6	Immunology		
1.7	Microbial ecology		
1.8	Major fields in microbiology		

	UNIT 2	**MICROBIAL DIVERSITY**	
	Reference: Brock 12th	**Teaching Duration:**	**Lectures 08**
2.1	Physiological diversity of microorganisms		
2.2	Bacteria		
2.3	Archaea		
2.4	Eukaryotic microorganisms		

	UNIT 3	**FUNDAMENTALS OF MICROSCOPY**	
	Reference: (Prescott 9th)	**Teaching Duration:**	**Lectures 12**
3.1	Lenses and banding of light		
3.2	Light microscopes		
	3.2.1 Bright field microscope and microscope resolution		
	3.2.2 Dark field microscope		
	3.2.3 Phase contrast microscope		
	3.2.4 Differential interference contrast microscope		
	3.2.5 Fluorescence microscope		
	3.2.6 Confocal Microscopy		
	3.2.7 Preparation and staining of specimens		
3.3	Electron microscopy		
	3.3.1 Transmission Electron Microscope		
	3.3.2 Scanning Electron Microscope		
	3.3.3 Electron cryotomography		
	3.3.4 Scanning probe microscopy		

	UNIT 4	**STAINS**	
	Reference: (Salle)	**Teaching Duration:**	**Lectures 07**
4.1	Dyes		
4.2	Leuco compounds		
4.3	Theories of staining		

REFERENCES:

- Willey J., Sherwood I., (2011), *Prescott, Harley and Kleins Microbiology*, 9th ed., Mc Graw – Hill.
- Salle A. J., (1984), *Fundamental Principles of Bacteriology*, 7th ed., Tata Mc Graw – Hill

Further Reading:

- Pelczar, Chan and Krieg, (2001), *Microbiology-Concepts and Application*, 5th Ed., McGraw-Hill. ISBN: 9780074623206

F.Y.B.Sc. Semester I

MB: 02 BACTERIAL AND ARCHEAL CELL STRUCTURE AND FUNCTION

	UNIT 1	CELL MORPHOLOGY & CYTOPLASMIC MEMBRANE	
	Reference: Brock 12th	**Teaching Duration:**	**Lectures 09**
1.1	Major cell morphologies		
1.2	Morphology and Biology		
1.3	Cell size and significance of smallness		
1.4	Surface area to volume ratio and its significance		
1.5	Lower limits of cell size		
1.6	The cytoplasmic membrane in *Bacteria* and *Archaea*		
1.7	The functions of cytoplasmic membrane		

	UNIT 2	CELL WALL OF PROKARYOTES	
	Reference: Brock 12th	**Teaching Duration:**	**Lectures 07**
2.1	The cell wall of bacteria: Peptidoglycan		
2.2	The outer membrane of gram negative bacteria		
2.3	Cell walls of *Archaea*		

	UNIT 3	OTHER CELL SURFACE STRUCTURE AND INCLUSIONS	
	Reference: Brock 12th	**Teaching Duration:**	**Lectures 08**
3.1	Cell surface layers, Pili and Fimbrae		
3.2	Cell inclusions		
3.3	Gas Vesicles		
3.4	Endospores		
3.5	Bacterial Ribosomes & Nucleoid		

	UNIT 4	MICROBIAL LOCOMOTION	
	Reference: Brock 12th	**Teaching Duration:**	**Lectures 07**
4.1	Flagella and Motility		
4.2	Gliding Motility		
4.3	Microbial Taxes		

REFERENCES:

- Madigan, T. M., & Martinko, J. M. (2008). *Brock Biology of Microorganisms*, 12TH Ed., Benjamin Cummings.

Further Reading:

- Willey J., Sherwood I., (2011), *Prescott, Harley and Kleins Microbiology*, 9th ed., Mc Graw – Hill.

F.Y.B.Sc. Semester I Practicals

MBP 01

Time Duration: 04 Hours/Week

1. Study of Microscope
2. Examination of hay infusion by wet mount technique.
3. Study of bacterial motility by Hanging drop technique
4. Measurement of dimensions of fungal structures by Ocular and stage Micrometer
5. Types of stains & Preparation of Staining solutions.
6. Monochrome staining by acidic and basic stain
7. Gram staining by modified Hucker's method
8. Staining of Acid fast & Non-acid fast bacteria – (Cold method) – Kinyoun carbol fuchsin
9. Spirochetes staining – Fontana's method
10. Preparation of nutrient broth / agar.
11. pH adjustment by Lovibond/ Hellige's comparator.
12. Disposal of Laboratory waste and cultures

REFERENCES:

1. Patel, R. J., & Patel, R. K., (2015). Experimental Microbiology, Vol. 1, 9th ed., Aditya.
2. Patel, R. J., & Patel, R. K., (2011). Experimental Microbiology, Vol. 2, 8th ed., Aditya.
3. Cappuccino, J.G., (2016). *Microbiology: A Laboratory Manual*, 11th ed., Pearson Education (Singapore) Pvt. Ltd.
4. Aneja, K.R., (2003). *Experiments in Microbiology, Plant Pathology, Tissue Culture and Mushroom Production Technology*, 4th ed., New Age International Publishers.

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