FYUGP CURRICULAR FRAMEWORK FOR BACHELORS PROGRAMME WITH MICROBIOLOGY AS MAJOR

SEMESTER	COURSE CODE	TYPE OF COURSE	TITLE OF COURSE	CREDITS	
				THEORY	TUTORIAL
I	MBY122J	CT-1	**MICROBIOLOGY:** FUNDAMENTALS OF MICROBIOLOGY	4	2
II	MBY222J	CT-1	**MICROBIOLOGY:** MICROBIOLOGICAL TECHNIQUES	4	2
III	MBY322J	CT-1	**MICROBIOLOGY:** CELL BIOLOGY AND BIOCHEMISTRY	4	2
IV	MBY422J1	CT-1	**MICROBIOLOGY:** MICROBIAL DIVERSITY AND ECOLOGY	3	1
	MBY422J2	CT-2	**MICROBIOLOGY:** IMMUNOLOGY	4	2
	MBY422J3	CT-3	**MICROBIOLOGY:** INSTRUMENTATION AND BIO-TECHNIQUES	4	2
V	MBY522J1	CT-1	**MICROBIOLOGY:** BACTERIOLOGY	3	1
	MBY522J2	CT-2	**MICROBIOLOGY:** MICROBIAL GENETICS AND GENOMICS	4	2
	MBY522J3	CT-3	**MICROBIOLOGY:** MYCOLOGY AND PHYCOLOGY	4	2
VI	MBY622J1	CT-1	**MICROBIOLOGY:** VIROLOGY	3	1
	MBY622J2	CT-2	**MICROBIOLOGY:** MICROBIAL PHYSIOLOGY AND METABOLISM	4	2
	MBY622J3	CT-3	**MICROBIOLOGY:** MOLECULAR MICROBIOLOGY AND RECOMBINANT DNA TECHNOLOGY	4	2
FOR FYUGP HONOURS					
VII	MBY722J1	CT-1	**MICROBIOLOGY:** INDUSTRIAL AND PHARMACEUTICAL MICROBIOLOGY	3	1
	MBY722J2	CT-2	**MICROBIOLOGY:** FOOD AND DAIRY MICROBIOLOGY	4	2
	MBY722J3	CT-3	**MICROBIOLOGY:** BIOSTATISTICS AND BIOINFORMATICS	4	2
VIII	MBY822J1	CT-1	**MICROBIOLOGY:** ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY	3	1
	MBY822J2	CT-2	**MICROBIOLOGY:** MEDICAL MICROBIOLOGY	4	2
	MBY822J3	CT-3	**MICROBIOLOGY:** MICROORGANISMS AND IPR	4	2
FOR FYUGP HONOURS WITH RESEARCH					
VII	MBY722J1	CT-1	**MICROBIOLOGY:** INDUSTRIAL AND PHARMACEUTICAL MICROBIOLOGY	3	1
	MBY722J2	CT-2	**MICROBIOLOGY:** FOOD AND DAIRY MICROBIOLOGY	4	2
	MBY722J3	CT-3	**MICROBIOLOGY:** BIOSTATISTICS AND BIOINFORMATICS	4	2
VIII	MBY822J1	CT-1	**MICROBIOLOGY:** ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY	3	1
	MBY822P	PROJECT	**MICROBIOLOGY:** PROJECT WITH DISSERTATION	12	

HEAD OF THE DEPARTMENT / CONVENOR BOUGS

BACHELORS WITH MICROBIOLOGY AS MAJOR

SEMESTER 1st

MBY122J MICROBIOLOGY _ FUNDAMENTALS OF MICROBIOLOGY

CREDITS: THEORY: 4, PRACTICAL: 2

Course objectives:

- *The course has been designed to give a basic understanding of the fundamental aspects of microbiology from historical development of the branch of microbiology*
- *The students will be introduced to the microbial world, the structure and significance of bacteria, fungi, algae, protozoa and viruses*
- *This course contains two basic lab practices and calculation needed for preparation of various reagents and buffers*
- *This course will enable students to understand working principles of different laboratory equipment's*
- *The students will learn different sterilization methods, preparation of culture media and pure culture techniques*

THEORY (4 CREDITS)

UNIT-1: HISTORY AND SCOPE OF MICROBIOLOGY

1a. Historical development of Microbiology-Theory of spontaneous generation, Biogenesis and Abiogenesis
1b. Contributions of Antony van Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister and Edward Jenner
1c. Contributions of Alexander Fleming, Martinus Beijerinck, Sergei Winogradsky and Elie Metchnikoff
1d. Fields and scope of microbiology
1e. Golden era of microbiology

UNIT-2: PROKARYOTES

2a. Ultra-structure of prokaryotic cell: bacterial and archaeal - cell wall and cell membrane
2b. Components external to cell wall - capsule, slime, s-layer, pili, fimbriae, flagella; structure, motility, chemotaxis
2c. Cytoplasmic matrix - Cytoskeleton, ribosome, inclusion granules: Composition and function.
2c. Bacterial nuclear material and Extra Chromosomal material
2d. Reproduction in bacteria

UNIT-3: EUKARYOTES

3a. Ultra-structure of eukaryotic cell: Types of cells; Structure and function of organelles: cell wall, cell membrane, flagella, cytoplasmic matrix, cytoskeleton and endoplasmic reticulum
3b. Structure and function of organelles: Golgi complex, peroxisomes, lysosomes, vesicles, ribosomes, mitochondria, chloroplast and nucleus
3c. Structure, composition and reproduction of fungi.
3d. Structure, composition and reproduction of Algae
3e. Structure, composition and reproduction of Protozoa

UNIT-4: VIRUSES AND VIRUS-RELATED STRUCTURES

4a. Introduction to Virology
4b. General characteristics of viruses
4c. Structure and composition of viruses
4d. Replication of viruses (overview)
4e. Sub viral particles: Satellite Viruses, Virusoids, Viroids, and Prions

Learning outcome:

- *Students will be familiarized with the history of development of science of microbiology.*
- *The students will develop the concept of the basic microbiology including the occurrence, cell structure and reproduction of various microbes.*

RECOMMENDED BOOKS:

1. Brock Biology of Microorganisms by Madigan and Martinko, 14th edition, Pearson Education International.
2. Prescott's Microbiology by Joanne Willey, Linda Sherwood and Christopher J. Woolverton, 11h edition, McGraw Hill Publisher Companies, Inc.
3. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology by Andreas Hofmann, 8th edition, Cambridge University Press.
4. Microbiology by Michael J. Pelczar JR, E.C. S. Chan, Noel R. Krieg, 5th edition, McGraw Hill Publisher Companies, Inc.
5. The Cell: A Molecular Approach by Geoffrey M. Cooper, Robert E. Hausman, 6th edition, Sinauer Associates Inc.

LABORATORY COURSE (2 CREDITS)
Course objective:

- *This course is framed to acquaint students with basic lab practices and calculation needed for preparation of various reagents and buffers*
- *This course will enable students to understand working principles of different laboratory equipment's*
- *The students will learn different sterilization methods, preparation of culture media and pure culture techniques*

1. Biosafety levels in microbiology laboratory
2. Understandings of biochemical calculations: molarity, normality, percent solution and ppm
3. Preparation of buffers and pH measurements
4. Study the parts, working principle and uses of Compound Microscope, Autoclaves and Hot air oven
5. Study the parts, working principle and uses of Laminar air flow and Incubator
6. Sterilization techniques: physical and chemical
7. Culture media and their preparation
8. Perform culture techniques: Streaking method, pour plate and spread plate method

Learning outcome:

- *Students will be able to perform various biochemical calculation, sterilization techniques and purification of microbial cultures*
- *Students will acquire knowledge about different microbiology laboratory equipment's and media preparations*

RECOMMENDED BOOKS:

1. Microbiology: A Laboratory Manual by James Cappuccino and Chad T. Welsh 11th Global Edition, Pearson Benjamin Cummings Publishers.
2. Practical Microbiology by D K Maheshwari and R C Dubey, 3rd edition, S Chand & Company Publishers.
3. Laboratory Fundamentals of Microbiology by Jeffrey C. Pommerville 12th edition, Jones and Bartlett Publishers.