Syllabus for Microbiology Minor

Semester: I	**Course No.: 113**	**Course Code: -- MIE-113 (T+P)** **Course Title: Microbial Saga: Discovery and Introduction**
Credits: 4		**Course Category: -Minor**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO113.1	REMEMBERING	Learn about the origin of life and the evolution of the microbiology field. Contributions of scientists pertaining to microbiology and different areas of microbiology.
CO113.2	UNDERSTANDING	Learn about the morphological and differential characteristics of different groups of microorganisms.

Unit No.	Unit Contents	Sessions Allotted
1	**Origin and History of the Microbial World:** Origin and history of the microbial world A. Origin of Microbial Life i. Biogenesis Vs Abiogenesis (Hypothesis and experiments) ii. Miller's experiments, Ubiquitous nature of microbial life. iii. Development from simple to complex life forms. B. History of Microbiology Significance of Scientific contributions in the development in Microbiology as a discipline: i. Early contributions: Robert Hook, Anton Van Leeuwenhoek, Louis Pasteur, Robert Koch, John Tyndall. ii. Scientific contribution leading to diversification of Microbiology: Recent milestone discoveries in the field of microbiology. C. Medical Microbiology and Immunology: Edward Jenner, Paul Ehrlich, Ellie Metchnikoff, Joseph Lister D. Food Microbiology and Fermentation: Alexander Fleming, Louis Pasteur, Selman Waksman E. Soil Microbiology: Sergei Winogradsky, Martinus Beijerinck F. Microbial Genetics: Watson and Crick, Hargobind Khurana, Griffith, Avery, McCarty, and Macloed G. Avenues of Microbiology	15
2	**Introduction to the Microbial world:** A. Distribution in nature. Different habitat: i. Terrestrial- soil and other animals, plants ii. Aquatic – Fresh and Marine water iii. Atmosphere- Air iv. Extremophiles – Temperature, Salt, Anaerobiosis, Pressure B. Major groups of microorganisms. i. Bacteria and Actinomycetes ii. Yeast and Fungi iii. Algae iv. Viruses v. Viroids and prions vi. Protozoa	15

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MIE-113(P): MICROBIOLOGY PRACTICALS

Paper Name: Microbiology Practicals

Credits: 02 (08 hrs/week Total: 60 hrs)

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO113.1	REMEMBERING	Describe the good lab practices and biosafety measures to be adopted while working in a microbiology lab. Explain the principle and applications of various instruments used in microbiology laboratory
CO113.2	UNDERSTANDING	Preparation, sterilization, and disposal of basic bacteriological media used for the cultivation of bacteria Handling and use of glassware used in microbiology laboratory
CO113.3	APPLYING	Apply staining techniques to prepare slides for microscopic examination of various types of microorganisms.

1. Introduction to microbiological laboratories: Dos and Don'ts
2. Study of principle, component parts, and operation of the compound light microscope
3. Study of principles and working of laboratory instruments: Autoclave, Hot air oven, Incubator, Water bath, Bacteriological Filters, Centrifuge, Rotary shaker, pH meter, Colorimeter
4. Disposal of laboratory waste and cultures
5. pH adjustment of solution by use of pH strip and pH meter
6. Preparation of bacteriological media: Nutrient broth and Nutrient agar
7. Study of curd sample by wet mount (temporary mount)
8. Simple staining of bacteria: Monochrome staining & Negative staining

Suggested Text Books:

1. Michael J Pelczar, JR. E.C.S. Chan, Noel R. Krieg. (1993) Microbiology, 5th Edition, Tata McGraw Hill Press.
2. Prescott L.M., Harley J.P., and Klein D.A. (2005). Microbiology, 7th Edition. McGraw Hill Companies Inc.

Suggested Reference Books:

1. Ingraham J. L. and Ingraham C.A. (2004). Introduction to Microbiology. 3rd Edition. Thomson Brooks / Cole.
2. Fundamentals of Microbiology – 6th edition, I. E. Alcamo, Jones, and Bartlett Publishers
3. H A Modi Elementary Microbiology Volume I Akta Prakashan, Nadiad
4. Black J G, (2002) Microbiology: Principles and Explorations, 5th edn, John Wiley and Sons, Inc.

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