Semester: II	**Course No.: 121**	**Course Code: MIM-121(T)** **Course Title: Basic Bacteriology**
Credits: 4		**Course Category: -Major**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO121.1	REMEMBERING	Have knowledge regarding the fine structure of bacterial cell Learn about the functions of bacterial organelles Learn the details of different surface organelles of bacteria
CO121.2	UNDERSTANDING	Define different terms involved in the nutrition of bacteria. Describe various media and their use for the cultivation of bacteria. Methods for cultivation of anaerobic bacteria
CO121.3	APPLYING	Understand the difference between pure and mixed culture Understand the techniques of isolation and pure culture Apply the technique to isolate a pure culture from different samples Learn preservation techniques
CO121.4	ANALYSING	Learn the taxonomic criteria for classification and nomenclature of bacteria Classify different species according to Bergey's Manual of Systematic Classification
CO121.5	EVALUATING	--

Unit No.	Unit Contents	Sessions Allotted
1	**Structural Organization of a Bacterial Cell** **A.** Surface appendages (a) Flagella (b) Pili and Fimbriae (c) Prosthecae and Stalks **B.** Surface layers (a) Capsule and Slime layer (b) Cell wall, **C.** Differential staining – Gram staining and Acid-fast staining (c) Cytoplasmic membrane and Mesosomes **D.** Cytoplasm and cell organelles (a) Cytoplasm (b) Ribosomes (c) Nuclear material and Plasmid (d) Cellular reserve food material (e) Bacterial Endospore – structure, sporulation and germination	**15**
2	**Nutrition and Cultivation of Bacteria** A. Nutritional and chemical requirements of bacteria: i. Carbon, ii. Oxygen, iii. Nitrogen, iv. Sulfur, v. Phosphorus, vi. Trace elements, vii. Vitamins,	**15**

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	viii. Growth factors ix. Water B. Nutritional diversities in bacteria i. Based on the source of energy: Phototrophs, Chemotrophs ii. Based on the source of electron donor: Lithotrophs, Organotrophs iii. Based on the source of carbon: Autotrophs, Heterotrophs, Mixotrophs, Obligate parasites C. Culture media : i. Media ingredients, ii. Preparation of media, iii. Types of media a. Based on the state of media: Solid, Broth, Semi-solid b. Based on ingredients: Natural, Synthetic, and complex c. Based on functions: General purpose, selective, Differential, Enriched and Enrichment media Biochemical media, Assay media and Enumeration Media D. Cultivation of anaerobic bacteria	
3	**Pures cultures techniques :** A. Pure culture, mixed culture, Selective methods to obtain pure cultures i. Chemical, ii. Physical, and iii. Biological Methods B. Isolation methods of pure culture : i. Aseptic technique ii. Streak plate, iii. Spread plate and iv. Pour plate techniques C. Cultural characteristics: Colony characters, Characteristics of broth cultures D. Maintenance and preservation of pure culture E. Culture collection centers	**15**
4	**Bacterial Taxonomy** **Taxonomy:** A. Introduction of different systems of bacterial classification B. Principles of binominal system of nomenclature C. Criteria for classification and identification i. Morphological characteristics, ii. Cultural characteristics, iii. Antigenic characteristics, iv. Physiological characteristics, v. Ecological characteristics, vi. Chemical composition and characteristics, vii. Genetic characteristics D. Introduction to Bergey's Manual of Systematic Bacteriology	**15**

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