

MICROBIOLOGY

Semester	Subject Code	Category	Lecture		Theory		P	C
I	21CPBT1C	Core - III	5 hrs per week	75	5 hrs per week	75	0	5

COURSE OBJECTIVES:

- This course helps the student to understand the microbial world, their growth nature, the pathogenicity and the exploitation of the microbes for agricultural and industrial applications.

COURSE OUTCOMES:

After completion of the course students will be able to

CO Number	CO Statement	Knowledge level K1 – K4
CO1	Understand the structure, classification of microbes and microscopy.	K2
CO2	Recognize and selection of media and sterilization method	K2
CO3	Deduce microbial interactions with the host	K4
CO4	Assess and evaluate the microorganisms causing diseases and test for its pathogenicity	K5
CO5	Diagnose the role of microbes in food industry	K5

Knowledge level: K1- Remember; K2- Understand; K3- Apply; K4- Analyze; K5- Synthesize; K6- Evaluate

MAPPING WITH PROGRAM OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	M	M	M
CO2	M	M	S	M	S	S
CO3	S	M	S	M	M	S
CO4	M	M	S	S	S	S
CO5	S	M	S	M	M	S

S-strong; M- medium; L-low

UNIT 1

General Classification Of Microbes And Microscopy:

15 Hours

Principles & classification of microbes – binomial nomenclature Whittaker five kingdom
Microscopic techniques: Visualization of cells and subcellular components by light microscopy, resolving powers of different microscopes, microscopy of living cells, scanning and transmission microscopes, different fixation and staining techniques for EM, freeze-etch and freeze fracture methods for EM, image processing methods in microscopy. Ultra structure – functions of microbial cellular compounds (bacteria, algae, viruses, fungi, protozoa).

UNIT II

Microbial Physiology, Media And Sterilization:

10 Hours

Microbial media – types. Sterilization and disinfection - Physical and chemical methods of sterilization – stain and staining methods – principles of staining - simple, differential, capsule, nuclear and spore staining methods. methods of obtaining Pure cultures - methods for microbial identification. Microbial growth – Phases of growth curve, Factors influencing the growth of microbes-classification (Temperature, pH, Nutrition) and nutritional types of microorganisms.

UNIT III

Host Parasite Interaction:

10 Hours

Recognition and entry processes of different pathogens like bacteria, viruses into animal and plant host cells, alteration of host cell behavior by pathogens, virus-induced cell transformation, pathogen-induced diseases in animals and plants, cell-cell fusion in both normal and abnormal cells. Immune response during bacterial (tuberculosis), parasitic (malaria) and viral (HIV) infections. Responses of plants to biotic (pathogen) stresses.

UNIT IV

Medical Microbiology:

10 Hours

Pathogenesis, lab diagnosis, prevention and control of important microbial diseases, Pathogenic bacteria diseases (E.coli, Tuberculosis, Leprosy, Typhoid) - Fungal diseases (Candida sp, Aspergillus, cryptococcus) Viral Diseases (HIV, Rabies, Hepatitis and Polio Virus) and Protozoan diseases (Plasmodium, Trypanosoma) .

UNIT V

Food Microbiology:

15 Hours

Microorganisms in Foods and methods for detection: Fresh meat, Processed meat and poultry, Culture, Microscopic, and Sampling Method for detecting microbes, Physical, Chemical methods.

Beneficial Uses of Microorganisms in Food Intestinal Beneficial Bacteria-Concept of Prebiotics and Probiotics, Genetically modified foods. Biosensors in food

Food Preservation & Principles of Quality Control: Chemicals antibiotics, Radiation, Low and high temperature, High-Pressure Processing Pulsed Electric Fields. Aseptic Packaging, Microbiological quality standards of food, FDA, HACCP, ISI.

Distribution of Marks: Theory 80% and Problems 20%

TEACHING METHODOLOGY:

- Class room teaching
- Assignments
- Discussions
- Homework
- PPT presentations
- Seminars
- Models and charts

TEXT BOOKS:

S.no	Authors	Title	Publishers	Year of publication
1	R. Anandanarayanan and C.K.J. Paniker.	Text book of Microbiology	Universities press	2017
2	Micheal J. Pelczar, E.C.S Chan, Noel R. Krieg	Microbiology	Tata-McGraw Hill	2008
3	W.C. Frazier and D.C. Westhoft	Food microbiology	tataMcgra Hill publication	2013
4	Richard V. Goering	Mim's Medical Microbiology	Elsievier	2012
5	Prescott, Harley and Klein	Microbiology	McGraw Hill Education	2015

REFERENCE BOOKS;

Sno	Authors	Title	Publishers	Year of publication
1	Jacquelyn G. Black	Microbiology	Wiley publications	2014
2	Paul A. Ketchum	Microbiology – concepts and application	Wiley publications	1988

WEB SOURCES:

1. http://www.microrao.com/micronotes/pg/culture_media.pdf
2. <http://library.open.oregonstate.edu/microbiology/chapter/introduction-to-microbiology/>
3. http://microbiology.ukzn.ac.za/Libraries/MICR304/CULTURE_PROCEDURES.sflb.ashx
4. <https://www.docsity.com/en/host-parasite-interactions-microbiology-lecture-slides/232518/>
5. <https://www.studocu.com/en/document/university-of-southern-queensland/medical-microbiology-and-immunology-1/lecture-notes/lectures-notes-1-to-23/319412/view>
6. <http://www.teilar.gr/dbData/ProfAnn/profann-f2bc2d4d.pdf>

Syllabus Designer:

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