

APPLIED FOOD, DAIRY AND ENVIRONMENTAL MICROBIOLOGY

Semester	Subject code	Category	Lecture		Theory		Practical		Credits
			Total hrs	Hrs/ week	Total hrs	Hrs/ week	Total hrs	Hrs/ week	
II	21CPMB2C	Core	45	3	45	3	0	0	3

COURSE OBJECTIVES

To enable the students to understand the basics of Food, Dairy & Environmental Microbiology

COURSE OUTCOMES

On successful completion of the course students will be able to understand preservation methods, fermented foods and pollution control.

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To analyze the ways to control microorganisms in foods and thus know the principles involving various methods of food preservation	K2
CO2	To analyze the beneficial role of microorganisms in fermented foods and in food processing and the microbiology of different types of fermented products.	K2
CO3	To categorize the microorganisms responsible for water-borne pathogenic microorganisms and their transmission and can assess the quality of drinking water	K2
CO4	To expertise the various biogeochemical cycles, plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications	K2
CO5	To apply the principles to solve the environmental problems –bioremediation	K3

Mapping with Programme Outcomes:

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

S- Strong; M- Medium; L- Low

UNIT –I: Food Microbiology**15 Hours**

Food Microbiology; sources of microbial contamination in foods; Factors influencing microbial growth in foods; Extrinsic and intrinsic; Principles and methods of food preservation; High temperature, Low temperature, Drying, Irradiation, hydrostatic pressure, high voltage pulse, microwave processing and Chemical preservatives; Food borne diseases.

UNIT- II: Dairy Microbiology**15 Hours**

Dairy Microbiology; Microflora of milk; Source of contamination, Preservation and Spoilage of milk and milk products, Milk borne diseases, Fermented foods – yoghurt, cheese. Prebiotics and Probiotics; Food sanitation, Food control agencies and their regulation-HACCP.

UNIT- III: Environmental Microbiology**15 Hours**

Microbiology of air: Droplet and droplet nuclei, Assessment of air quality, Air sanitation; Air borne diseases; Microbiology of water: Water borne diseases, water purification and portability. Waste water treatment- type – characterization. Treatment of solid waste.

UNIT- IV: Microbiology of soil and Interactions**15 Hours**

Characteristics and classification of soils; Soil microorganisms; Interaction between microorganisms- Lichens. Interaction of microbes with plants – rhizosphere, phyllosphere, Mycorrhizae. Interaction of microbes with plants- Ruminants, Insects. Biogeochemical cycles- carbon, nitrogen, phosphorus, oxygen. Biofertilizers- Rhizobium, Azotobacter, Azospirillum, Phosphate solubilizers, algal biofertilizers. Biopesticides – *Bacillus thuringensis*, *Beauveria bassiana*, viral biopesticide.

UNIT- V: Bioremediation**15 Hours**

Degradation of xenobiotic compounds. Role of GEM in bioremediation, Biodeterioration of materials by microbes – paper, wood, leather, paint. Metal corrosion, bioaccumulation of heavy metals, bioflocculation, biofouling, bioleaching, biofilms.

TEXT BOOKS:

S.no	Authors	Title	Publishers	Year of publication
1	Frazier WC and Westhoff DC	Food Microbiology.	Tata McGraw Hill Publishing Company LTD . New Delhi.	2013
2	Adams M.R and MO	Food Microbiology.	The Royal Society of Cambridge.	2008
3	EC Eldowrley S,Hardman OJ and Waite S.	Pollution :Ecology and Biotreatment.	Longman Scientific Technical.	1993
4	Baker KH and Herson OS.	Bioremediation	McGraw Hill , Inc. New York.	1994

REFERENCE BOOKS:

S.no	Authors	Title	Publishers	Year of publication	
1	Robinson RK	Dairy Microbiology,	John Wiley and Sons, Inc., United Kingdom.	2002	
2	Banwart G.J.	Basic Food Microbiology.	Chapman & Hall ,New York.	1989	
3	Stanbury. P.F, A. Whittakker & S.J. Hall	Principals of fermentation technology.	Pergmon Press.	2005	
4	Baker KH and Herson OS.	Bioremediation	McGraw Hill , Inc. New York.	1994	

TEACHING METHODOLOGY:

- Lectures
- Power point presentation
- Charts
- Models
- Group discussion
- Group assignments
- Seminars

WEB SOURCES

<http://www.fsis.usda.gov/>

<http://www.microbes.info/>

<http://www.epa.gov/nerlcwww/>

SYLLABUS DESIGNER:

- Dr. A.Vidhya HOD & Assistant Professor