CORE IX

ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY

Semester	Subject code	Category	Lecture		Theory		Practical		Credit
			Total hrs	Hrs/ week	Total hrs	Hrs/ week	Total hrs	Hrs/ week	
VI		Core	60	4	60	4	0	0	4

COURSE OBJECTIVES

To enable the students to understand the concepts of Environmental and Agricultural Microbiology.

COURSE OUTCOMES

On the successful completion of the course students will be able to acquire knowledge about common agents and its causes

CO Number	CO Statement	Knowledge level (K1-K4)
CO1	To learn the diversity of microorganism and microbial communities inhabiting at a multitude of habitats and occupying a wide range of ecological habitats.	**K3**
CO2	To know the Microorganisms responsible for Air pollution especially Air-borne pathogenic microorganisms and their transmission	**K3**
CO3	To comprehend the various methods to determine the Sanitary quality of water and sewage treatment methods and Water-borne pathogenic microorganisms and their transmission	**K3**

CO4	To understand various plant microbes interactions especially rhizosphere, phyllosphere and mycorrhizae and their applications especially the biofertilizers and various biogeochemical cycles – Carbon, Nitrogen, Phosphorus cycles etc. and microbes involved	**K3**
CO5	To understand the basic principles of environment microbiology and be able to apply these principles to understanding and solving environmental problems – waste water treatment and bioremediation .	**K3**

MAPPING WITH PROGRAMME OUTCOMES:

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

S- Strong; M- Medium; L- Low

Unit I: Microbial ecology (12 Hrs)

Introduction : structure and function of ecosystem , Natural habitats of microorganisms. Microbial communities in aquatic & terrestrial habitats, Extreme habitats in environment Microorganisms as components of ecosystems as producers & decomposers.

Unit II: Microbiology of air (12 Hrs)

Microbiology of air - Composition, Distribution and sources of air borne organisms, Droplet and droplet nuclei, Assessment of air quality; Air sanitation, Air borne disease.

Unit III: Aquatic microbiology (12 Hrs)

Aquatic microbiology – Microbial assessment of water quality, purification. Waterborne disease. Microbiological analysis of water purity, Indicator organisms, ground water quality.

Unit IV: Soil microbiology (12 Hrs)

Soil microbiology – Physiochemical properties of soil and interaction of microorganisms with – plants – rhizosphere – phyllosphere Microbial interactions – symbiosis, mutualism, commensalisms, competition, ammensalism, synergism, parasitism and predation –Major Biogeochemical cycles – carbon, nitrogen, phosphorus, sulfur.

Unit V: Waste water Microbiology (12 Hrs)

Waste water treatment – liquid wastes, solid wastes. Bioremediation- Degradation of xenobiotic compounds. bio manure ,- advantages and processing parameters.

DISTRIBUTION OF MARKS: Theory **-** 100% and Problems – Nil

TEACHING METHODOLOGY:

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

TEXT BOOKS:

Sl No:	Book name	Author	Publisher	Year of publication
01	Biofertilizers in Agriculture and Forestry,	Subba Rao. N.S	Medtech	2017
02	Environmental aspects of Microbiology	Joseph C. Daniel	MFJ Publications	1998
03	Environmental Microbiology	Vijaya Ramesh, K.	MJP Publishers, Chennai, India.	2019
04	Soil Microbiology	Subba Rao N.S.	Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, India.	2020

REFERENCE BOOKS:

Sl no:	Book name	Author	Publisher	Year of publication
01	Microbial Ecology.	Campbell R	2nd Ed. Blackwell Scientific Publications. London	1983
02	Aquatic Microbiology,	Reinheimer, G	2nd Ed. John Wiley andSons, hichestes, London.	2001
03	Introduction to Soil Microbiology.	Alexander M	John Wiley and Sons N.Y.press	2000
04	Introduction to Environmental	Mitchell R	Prentice – Hall. Inc. Englewood	1994

	Microbiology.		Clifs – New Jerry.	
05	Environmental Microbiology	Maier, R. M., I. L. Pepper and C. P. Gerba.	Edition, Academic Press, United States.	2014

WEB SOURCES:

http://www.environmentalmicrobiology.mpg.de/

http://www.wastewater.com/

http://aquatis dcsc.edu/

http://www.env.harvard.edu/biolinks.html

http://www.horizonpress.com/gateway

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