ELECTIVE IV

MARINE MICROBIOLOGY

Semester	Subject code	Category	Lecture		Theory		Practical		Credit
			Total hrs	Hrs/ week	Total hrs	Hrs / week	Total hrs	Hrs/ week	
VI		Core	45	3	45	3	0	0	3

COURSE OBJECTIVES

To enable the students to understand the basics of Marine Microbiology

COURSE OUTCOMES

On the successful completion of the course, students will be able to know the basics of Marine Microbiology

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To understand the significance of Marine Ecosystem	**K2**
CO2	To understand and get familiarized with Marine Biodiversity	**K2**
CO3	To understand about Marine Pollution and Bioremediation	**K2**
CO4	To understand about Marine Microbial Diseases and Marine Research Centers	**K2**
CO5	To understand about Marine Microbial Technology	**K2**

MAPPING WITH PROGRAMME OUTCOMES:

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

S- Strong; M- Medium; L- Low

Unit-I: Marine Ecosystem 9 hrs

Marine environment–properties of seawater, Ecology of benthic & littoral zone, saltpan, mangroves and estuarine microbes, Marine microbial symbionts –Seaweeds - microbial interactions, coral-microbial association, sponge-microbial interactions.

Unit-II: Marine Biodiversity 9 hrs

Marine Extremophiles - Thermophiles, Halophiles, Alkaliphiles, Barophiles, Psychrophiles. Adaptation strategies of Halophiles. Hydrothermal vents, Biotechnological applications of extremozymes from extremophilic organisms.

Unit- III: Marine Pollution & Bioremediation 9 hrs

Microbial consortia and genetically engineered microbes in bioremediation of polluted marine sites – heavy metals and crude oil. Biofouling on marine structures and their control, Marine algal blooms and its control

Unit-IV: **Marine Microbial Diseases and Marine Research Centers 9 hrs**

Marine food borne pathogens –*Aeromonas, Vibrio, Salmonella, Pseudomonas,* and algal toxins. Marine research centers in India- National Institute of Oceanography (Goa), National Institute of Ocean Technology (Chennai), Central Institute of Fisheries Technology (Kerala).

Unit- V: Marine Microbial Technology **9 hrs**

Production and applications of marine microbial products – Carrageenan - agar-agar – pigments (Astaxanthin, β carotene) – enzymes – antibiotics – polysaccharides – Biosurfactants.

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	Microbiology	Prescott, L.M., Harley J.P. Klein	McGraw Hill Publications	2008
02	Marine Biology	Peter Castro	McGraw-Hill Education; 9 edition	2018
03	Marine Biology: Function, Biodiversity, Ecology	Jeffrey S. Levinton	Oxford University Press Inc	2017

REFERENCE BOOKS:

Sl no:	**Book Name**	**Author**	**Publisher**	**Year of Publication**

01	Marine Pollution	R.B. Clark,	Oxford University Press	2001
02	**Marine Microbiology Bioactive Compounds And Biotechnological Applications**	Kim	John Wiley	2013
03	Marine Microbiology	John Paul	Academic Press	2001

WEB SOURCES:

www.studocu.com

www.nature.com

https://marine microbiology

https://nptel.ac.in

SYLLABUS DESIGNER:

1. Dr.J.Hemapriya, Assistant Professor

1. Dr. A.Vidhya HOD & Assistant Professor