



GUJARAT TECHNOLOGICAL UNIVERSITY

Integrated Master of Science (Biotechnology)

Semester: 7

Subject Name: Marine Ecology

Subject Code: 1370413

Prerequisite:

Basic understanding of biology, environmental science, and oceanography is required. Familiarity with ecological principles, aquatic ecosystems, and biodiversity will help students grasp the interactions between marine organisms and their environment and apply ecological concepts to marine conservation and resource management.

Rationale:

Marine Ecology explores the structure, function, and dynamics of marine ecosystems, emphasizing biodiversity, ecological processes, and human impacts. It equips students with the knowledge to analyze marine food webs, climate change effects, and conservation strategies, fostering sustainable management of marine resources and ecosystem health.

Course Scheme :

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
4	0	0	4	70	30	0	0	100

Course Content:

Unit No.	Content	No. of Hours	Weightage (%)
1	Marine environment ecological factors light, temperature, salinity, pressure. Classification of marine environment pelagic environment, planktonic and nektonic adaptations, benthic environment intertidal, interstitial and deepsea adaptation. Other coastal environments coral reefs, estuaries, mangroves, seagrass beds, kelp forests, polar seas and hydrothermal vents.	12	20
2	Animal association in marine environment- endocism, inquilinism- phoresis-epizoism -mutualism- communalism- symbiosis- parasitism. Marine zoogeography with reference to Indian Arctic and Antarctic Oceans.	12	20
3	Population Ecology- group attributes, population growth, density variations, concept of carrying capacity. Dispersal, prey-predator relationship- density dependant- density independent factors.	12	20
4	Structure and composition, diversity and stability, concept of niche, succession, community wise adaptation, e.g. fouling and boring community.	12	20
5	Marine Ecosystems concepts- principal components- marine food chains-trophic structure food web- ecological pyramids-	12	20



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	energy flow- evolution and management-system ecology and modeling.		
		Total Hours:	60
			100

Textbook:

1. Barnes R. S. K , 1999, Introduction to Marine Ecology, Blackwell Science.
2. Jeffery S. Levinton 2000 Marine Ecology, Biodiversity and Function. Oxford University Press.
3. Bertness, M.D, S. D. Gaines and M.K. Hay 2000. Marine Community Ecology Sinauer Associates.

Reference Books:

1. Gage. J.D. and P.A. Tyler, 1991. Deep Sea Biology, Cambridge University Press, Cambridge.
2. Balakrishna Nair, N. and D.M. Thampy, 1980 A text Book of Marine Ecology, The Macmillan Co. of India Ltd., New Delhi.
3. Crowder, 1991 William Seashore Life Between the Tides, Dover Publication

Course Outcomes:

No.	Course Outcomes	RBT Level*
1	Explain the fundamental principles of marine ecology, including ecosystem dynamics and biodiversity	RM, UN
2	Describe the interactions between marine organisms and their physical, chemical, and biological environments	UN, AP
3	Analyze the impact of natural and anthropogenic factors on marine ecosystems and biodiversity.	AN, EL
4	Evaluate ecological models, food webs, and nutrient cycles in different marine ecosystems.	EL, CR
5	Apply ecological principles to marine conservation, fisheries management, and climate change mitigation.	AP, CR

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create
