2020

M.Tech.in Marine Biotechnology

Curriculum

To ignite young talented minds having strong foundation in Science to take up major challenges which human race faces and to find practical solutions through marine biotechnological interventions

SPONSOED BY DEPARTMENT OF BIOTECHNOLOGY
GOVERNMENT OF INDIA

NATIONAL CENTRE FOR AQUATIC ANIMAL HEALTH
COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY
LAKESIDE CAMPUS
FINE ARTS AVENUE
COCHIN -682016

M. Tech. Marine Biotechnology

The M.Tech. programme in Marine Biotechnology sponsored by Department of Biotechnology, Government of India is an unique educational programme in its kind in India.

Why M.Tech. in Marine Biotechnology?

To ignite young talented minds having strong foundation in Science to take up major challenges which human race faces and to find practical solutions through marine biotechnological interventions. The challenges to be addressed are:

1. *Food and nutritional security through enhancement of marine/aquatic food production through intensive aquaculture*
2. *Depleting fuel stock and requirement of next generation fuel (Bio-fuel) for next generation human race*
3. *Climate change and need of its reversal for survival*
4. *Human and animal health related issues and requirement of next generation pharmaceuticals with least or no side effects*

Over above three decades, Government of India has been supporting infrastructure development and research in focused areas of Marine Biotechnology to develop novel processes and products aiming at enhancement of marine biotech industrial processes, biomedical material development, environment management and intensive aquaculture production. In any such movement, appropriate manpower with the right mind set is a vital component, and to satisfy this requirement the M.Tech. programme in Marine Biotechnology has been conceptualized. The curriculum has been built with the global concept of education 'Find Solutions to the Human Problems in Class Rooms'. Through this programme we look forward to generate Academicians, Scientists, Technocrats, Entrepreneurs and Planners to address the above cited issues and to find appropriate solutions.

The programme is offered at National Centre for Aquatic Animal Health, Cochin University of Science and Technology under the supervision of an Advisory Board having Vice Chancellor as the patron and a Placement and Biotechnology Entrepreneurship Committee to ensure the placement of students desirous to work in Industries or provide handholding support to students desirous to start their own enterprise/start-ups under different schemes of Central/State Government, both constituted by the University as per the directives of DBT.

Admission to the programme is through qualifying Graduate Aptitude Test in Biotechnology (GAT-B), conducted by the Regional Centre for Biotechnology, Faridabad on behalf of the Department of Biotechnology, Government of India. This

examination is to rank the eligibility of the candidate among all applicants, and the candidates will be given a GAT-B rank based on which they may apply to M Tech. programme in Marine Biotechnology.

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Scheme of Examination in M.Tech. in Marine Biotechnology

Duration of the course 4 semesters

Eligibility:

Minimum 60% marks or equivalent CGPA (under grading system) from any recognized university in any one of the following.

B.Tech. or BE in Biotechnology/M.Sc. in any branch of Life Science including Marine Biology

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Accumulated minimum credits required for successful completion of the programme- 72

Semester 1

Course Code and Title	Instruction		Evaluation - Percentage Marks				Total
Theory	C/E	Credits	Assignments	Class Test 1	Class Test 2	End Semester Examination	
Theory (Core)							
20-431-0101 Biotechnological Interventions in Marine	C	2	20	20	20	40	100

Biodiversity Conservation							
20-431-0102 Marine Genomics and Proteomics	C	3	20	20	20	40	100
20-431-0103 Marine Bioprospecting and Drug Discovery	C	3	20	20	20	40	100
20-431-0104 Bioprocess Engineering -1	C	3	20	20	20	40	100
Theory (Elective)							
20-431-0105 Cell and Hybridoma Technology	E	2	20	20	20	40	100
20-431-0106 Marine Microbiology	E	2	20	20	20	40	100
20-431-0107 Bio informatics, Systems and Computational Biology	E	3	20	20	20	40	100
20-431-0108 Nano-biotechnology	E	2	20	20	20	40	100
Lab (Skill Development)							
20-431-0109 Skill Development in Recombinant DNA Technology	C	2	-	25	25	50	100
20-431-0110 Skill Development in Marine Microbial Diversity Determination	C	2	-	25	25	50	100
20-431-0111 Skill Development in Cell culture and hybridoma/Antibody Technology	C	1	-	25	25	50	50

Core: 16 Credits; Elective: 9 Credits; Total: 25.

Semester 2

Course Code and Title	Instruction		Evaluation				Total
Theory	**C/E**	**Credits**	**Assignments**	**Class Test 1**	**Class Test 2**	**End Semester Examination**	
Theory (Core)							
20-431-0201 Biotechnological interventions in Aquatic Animal Health	C	3	20	20	20	40	100
20-431-0202 Bioprocess Engineering (Marine Natural Products, Biomaterials and Probiotics)-II	C	3	20	20	20	40	100
20-431-0203 Marine Algal Biotechnology	C	2	20	20	20	40	100
20-431-0204 Genetic Improvement for High health brood stock	C	2	20	20	20	40	100
Theory (Elective)							
20-431-0205 Model systems, Molecular Genetics and Genome engineering	E	2	20	20	20	40	100
20-431-0206 Advances in marine drug discovery	E	2	20	20	20	40	100
Inter disciplinary Elective*	IDE	4	20	20	20	40	100
20-431-0208 Enzyme Engineering & Technology	E	2	20	20	20	40	100
Lab (Skill Development)							

0-431-0209 Skill Development in Biotechnological Interventions in Aquatic Animal Health Management	C	2	-	25	25	50	100
20-431-0210 Skill Development in Maine Bioprospecting and Bioprocess Engineering.	C	2	-	25	25	50	100
20-431-0211 Skill Development in Model systems, Molecular genetics and Genome engineering	C	1	-	25	25	50	100

** As part of choice based credit system, a student has to opt for an interdisciplinary elective course offered by other Departments in the University.*

Core: 15 Credits; Elective: 10 Credits; Total: 25

Semester 3

Course Code and Title	Instruction		Evaluation				Total
Theory	**C/E**	**Credits**	**Assignments**	**Class Test 1**	**Class Test 2**	**End Semester Examination**	
20-431-0301 Bioentrepreneusrhip and industry management	C	2	20	20	20	40	100
20-431-0302 Research Methodology and Scientific Communication	C	2	20	20	20	40	100
20-431-0303 Intellectual Property Rights,	C	2	20	20	20	40	100

Biosafety and Bioethics							
20-431-0304 Project proposal preparation and submission	C	2	20	20	20	40	100
Skill Development Programme inf the Area of Specialization (continuous evaluation) (Any one of the programmes per student)							
20-431-0305 Drug discovery from marine biologicals	E	5	20	20	20	40	100
20-431-0306 Model systems, molecular genetics and Genome engineering	E	5	20	20	20	40	100
20-431-0307 Marine algae for bio-fuel production and animal nutrition	E	5	20	20	20	40	100
20-431-0308 Molecular diagnostics and therapeutics/ health management strategies	E	5	20	20	20	40	100
20-431-0309 Bioprocess engineering and computational modeling	E	5	20	20	20	40	100
Research Project	C/E	Credits	Assessment by the Research Guide*			Assessment by the Examination Committee	Total
20-431-0310 Research Project in the Area of Specialization: Progress 1	C	10	50			50	100

***Based on periodic assessment of the work of the candidate*

Core: 18 credits; Elective: 5 credits; Total Credits: 23

Semester 4

Course Code and	Instruction	Evaluation

Title	C/E	Credits	Assessment by the Research Guide*	Assessment by the Examination Committee	Total
20-431-0401 Research Project in the Area of Specialization: Progress Review 2 and Report Submission and Presentation	C	12	50	10	100
20-431-0402 Viva Voce Examination (Comprehensive)	C	6	50	50	100

***Based on periodic assessment of the work of the candidate*

Core: 18 credits

Total credits: 91 (Core: 67 Elective: 24)

Semester 1: 25; Semester 2: 25; Semester 3: 23; Semester 4: 18.

General regulations to be known by students:

1. A student shall acquire a minimum of 36 credits in the first and second semesters before he/she registers for third semester.
2. The minimum number of credits to be earned by a student for the award of the M.Tech. degree shall be 72 subject to the condition that the candidate successfully completes all the prescribed core and elective courses.
3. Minimum attendance required: 75%

Grading Scale

Range of Marks	Grade	Weightage
0-49	F- Failed	0
50-60	D- Satisfactory	6
60-70	C- Good	7
70-80	B - Very Good	8
80-90	A - Excellent	9
90 and above	S - Outstanding	10

Overall performance at the end of the semester will be indicated by Grade Pont Average (GPA) calculated as follows:

$$GPA = \frac{G_1C_1+G_2C_2+G_3C_3+ \ldots\ldots\ldots\ldots G_nC_n}{C_1+C_2+C_3+ \ldots\ldots\ldots\ldots\ldots\ldots C_n}$$

where 'G' refers to the grade weightage and 'C' refers to the credit value of corresponding course undergone by the student.

At the end of the final semester Cumulative Grade Point Average (CGPA) will be calculated based on the above formula.

Classification for the Degree (M. Tech.) will be as follows

Classification	CGPA
First Class with distinction	**8 and above**
First Class	**6.5 and above**
Second Class	**6 and above**

Declaration of Results

The final marks will be reported to the University for tabulation and declaration of results. The University shall issue mark list at the end of each semester.