

DEPARTMENT OF MARINE BIOTECHNOLOGY

M.Sc., Marine Biotechnology

CURRICULUM AND SYLLABUS



**Department of Marine Biotechnology
AMET Deemed to be University
Kanathur, Chennai-603112
Tamilnadu, India.**

2021-2022

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Vision and Mission of the University

VISION

To sustain identity as a World Class Leader in Maritime Education and empower learners with wholesome knowledge through progressive innovation in training, research and development which will render students a unique learning experience and a transformation impact on the Global Society.

MISSION

AMET will strive continuously to

- 1 Impart value-based higher education and technical knowledge with uncompromising strides of an outstanding quality.
- 2 Be a Centre of Excellence in skill development in emerging technologies in accordance with industrial trends.
- 3 Create World class research capabilities on par with the finest in the world and broaden student's horizons beyond classroom education.
- 4 Nurture talent and entrepreneurship and enable all round personality development in students.
- 5 Empower students from across socio economic strata.
- 6 Make a positive difference to society through technical education.

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DEPARTMENT OF MARINE BIOTECHNOLOGY

VISION

To be a Centre of excellence in the field of biotechnology equipped to nurture world-class bioengineers with a potential to innovate, discover and disseminate knowledge for the welfare of mankind.

MISSION

Our Mission is to impart world class higher education in Marine Biotechnology with the following approaches

- 1 To transform into a comprehensive and a multidisciplinary biotechnology center that supports, coordinates, disseminates and advances biotechnology
- 2 To impart quality education for life long professional growth and opportunity in a wide range of Careers
- 3 To become a resource center for biotechnology information and education to create awareness towards socio ethical implications of potentials of biotechnology
- 4 To initiate multi-disciplinary programs through academia-industry interface with a special emphasis on implementation of bioprocess and scale-up
- 5 To endow students with the educational opportunity belonging to different socio-economic backgrounds
- 6 To engage in the fruitful research that can be beneficial to create a better society

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**ALIGNING THE DEPARTMENT VISION AND MISSION
WITH THE UNIVERSITY VISION AND MISSION**

Vision / Mission	AMET (Deemed to be University)	Department of Marine Biotechnology
Vision	To sustain identity as a World Class Leader in Maritime Education and empower learners with wholesome knowledge through progressive innovation in training, research and development which will render students a unique learning experience and a transformation impact on the Global Society.	To be a Centre of excellence in the field of biotechnology equipped to nurture world-class bioengineers with a potential to innovate, discover and disseminate knowledge for the welfare of mankind.
Mission-1	Impart value-based higher education and technical knowledge with uncompromising strides of an outstanding quality.	To transform into a comprehensive and a multidisciplinary biotechnology center that supports, coordinates, disseminates and advances biotechnology
Mission-2	Emerge as a Centre of Excellence inculcating skill development in recent technologies in accordance with industrial trends.	To impart quality education for life long professional growth and opportunity in a wide range of Careers
Mission-3	Create World class research capabilities on par with the finest in the world and broaden student's horizons beyond classroom education.	To become a resource center for biotechnology information and education to create awareness towards socio ethical implications of potentials of biotechnology
Mission-4	Nurture talent and entrepreneurship and enable all round personality development in students.	To initiate multi-disciplinary programs through academia-industry interface with a special emphasis on implementation of bioprocess and scale-up
Mission-5	Empower students from across socio economic strata.	To endow students with the educational opportunity belonging to different socio-economic backgrounds
Mission-6	Make a positive difference to society through technical education.	To engage in the fruitful research that can be beneficial to create a better society

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Department of Marine Biotechnology

M.Sc. MARINE BIOTECHNOLOGY – 2021-2022 (REGULATION-E)

Introduction:

M.Sc., Marine Biotechnology is a unique post graduate degree which is offered by few institutions in India. AMET University is proud to have such a unique course with International Standards. New pharmaceutical companies are focusing on developing new drugs from marine resources. The enhanced focus on aquaculture will generate thousands of jobs for trained Marine Biotechnologists. The growing use of marine products in the food, cosmetic, and agriculture industries has created a current demand that we can barely meet. Hence, doing M.Sc., Marine Biotechnology at AMET University is all to enhance your job opportunities in the research and development and industry sector pertaining to Marine Biotechnology.

Planning of course:

Our course curriculum has been very sincerely prepared to help the students to get world class information and exposure. Our PG program has been planned in such a way to equip the students to make them confident enough in facing the Job market. Our course curriculum has given equal emphasis on both industry, research and academia needs. We encourage our post graduate students to take part in the scientific events throughout the Nation. During their course, they need to undergo research projects through which many of our students have got publications in refereed journals of international reputation. Industrial visits, field visits and tours are part of the curriculum.

Programme outcomes

PO1. Make the students to well versed in the field of marine environment studies so that they will be confident enough to carry out their knowledge practically in the areas individually and meticulously.

PO2. Foster analytical and critical thinking abilities to find out the problems and can work meticulously on that aspect.

PO3. Build the students knowledge on how to design a fermentor for production purposes and scale up processes.

PO4. Formulating their research progress and they will know how to present it as a complete research study with the help of statistical analysis.

PO5. Motive towards the value of natural resources and they will know what the nature provide us with a wealthy resource and they will know the importance of preserving it.

PO6. Inculcate innovative thinking to address a problem or solution to the research community

PO7. Demonstrate their ability to design and experiments interpret and analyze data, and report results with international standards.

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Programme Specific Outcomes

PSO1 Understand the nature and basic concepts of cell biology, Biochemistry, Molecular Taxonomy and Microbiology.

PSO2 Analyze the relationships among animals, plants and microbes

PSO3 Perform procedures as per laboratory standards in the areas of Biochemistry, Bioinformatics, Molecular taxonomy and Molecular biology

PSO4 Understand the applications of biological sciences in Aquaculture, Genomics and Proteomics

Programme Educational Objectives (PEO)

PEO 1. Inculcate the interest to do research in marine environment, which is an unexplored area which has a huge resource hidden in that. It help the students to get world class information and exposure

PEO 2. Motivate the students to kindle the natural resources found in the ocean to get some unidentified microbial diversity enriched in the marine environment which has been untouched. Enzyme technology, Secondary metabolites from marine organisms, Marine Bioproducts and Bioprocess Technology with a core theme of bioactive molecules from marine resources is a good area to work on.

PEO 3. To create an interest in the students what are industrial products and practices that are followed in the production of various industrial products and processing and make them a valuable source for industries.

PEO4. Demonstrate high standard of ethical conduct, positive attitude and societal responsibilities in their chosen areas of career

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Mapping of PEOs with POs

Program Educational Objectives (PEOs)	Program Outcomes (POs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
PEO1: Inculcate the interest to do research in marine environment, which is an unexplored area which has a huge resource hidden in that. It help the students to get world class information and exposure	✓	✓	✓	✓	✓	✓	✓
PEO2: Motivate the students to kindle the natural resources found in the ocean to get some unidentified microbial diversity enriched in the marine environment which has been untouched. Enzyme technology, Secondary metabolites from marine organisms, Marine Bioproducts and Bioprocess Technology with a core theme of bioactive molecules from marine resources is a good area to work on.	✓	✓	✓	✓	✓	✓	✓
PEO3: To create an interest in the students what are industrial products and practices that are followed in the production of various industrial products and processing and make them a valuable source for industries.	--	--	✓	✓	✓	--	✓
PEO4: Demonstrate high standard of ethical conduct, positive attitude and societal responsibilities in their chosen areas of career	✓	✓	--	✓	--	✓	--

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DEPARTMENT OF MARINE BIOTECHNOLOGY
M.Sc., Marine Biotechnology 2021-2022 (Regulation E)
List of Courses for the Program
(Semester wise)

SEMESTER – I

Sl. No	SUB CODE	SUBJECT TITLE	C	L	T	P	M
1	PEBT101	Oceanography and marine Bioresources	4	4	0	0	100
2	PEBT102	Cell and Developmental Biology	3	3	0	0	100
3	PEBT103	Marine Microbiology	3	3	0	0	100
4	PEBT104	Biochemistry and Molecular Biology	4	4	0	0	100
5	PEBT105	Immunology and Biomedical sciences	3	3	0	0	100
6	PEBT1PB	Practical – I Oceanography, Marine Bioresources and Marine Microbiology	3	0	0	6	100
7	PEBT1PC	Practical – II Immunology, Cell and Developmental Biology and Molecular Biology	3	0	0	6	100
8	PEBT1PA	Career Orientation Skills (Luminous Club)	1	0	1	0	100
9	UELECPB	Soft Skills-I/ Communication Skills-I	1	1	0	0	100
TOTAL			25	18	1	12	-

TOTAL: 30 Periods/week + 1 Seminar

Note:

PBLECPA: Soft Skills/Communication Skills-Offered by Department of English

PEBT1PA: Career Orientation Skills

Through Luminous Club, activities will be engaged and evaluations will be done by respective mentors. Activities include Organizing events such as debates, quiz, seminars etc. Evaluation will be based on Monthly reports by each student.

SEMESTER – II

Sl. No	SUB CODE	SUBJECT TITLE	C	L	T	P	M
1	PEBT201	Genetics and Genetic Engineering	3	3	0	0	100
2	PEBT202	Molecular Techniques and Diagnostic	3	3	0	0	100
3	PEBT203	Marine Pharmaceutics and Cosmeceutics	3	3	0	0	100
4	PEBT204	Marine Bioprocess Technology	3	3	0	0	100
5	Core Elective Course-I		3	3	0	0	100
6	Core Elective Course-II		3	3	0	0	100
8	PEBT2PB	Practical – III Genetic Engineering, Molecular Techniques and Diagnostics	3	0	0	6	100
9	PEBT2PC	Practical – IV Marine Pharmaceutics and Cosmeceutics; Marine Bioprocess Technology	3	0	0	6	100

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10	PEBT2PA	Career Orientation Skills (Luminous Club)	1	0	1	0	100
TOTAL			24	19	1	12	-
TOTAL: 31 Periods/week + 1 Seminar							
Note:							
PEBT2PA: Career Orientation Skills							
Through Luminous Club, activities will be engaged and evaluations will be done by respective mentors. Activities include Organizing events such as debates, quiz, seminars etc. Evaluation will be based on Monthly reports by each student							

SEMESTER – III

Sl. No	SUB CODE	SUBJECT TITLE	C	L	T	P	M
1.	PEBT301	Aquaculture and Marine Food Technology	4	4	0	0	100
2.	PEBT302	Bio safety, Bioethics and IPR	3	3	0	0	100
3.	PEBT303	Marine environmental biotechnology	3	3	0	0	100
4.	PEBT304	Entrepreneurship in Marine Biotechnology	3	3	0	0	100
5.	PEBT304	Biostatistics, Bioinformatics and Nanobiotechnology	3	3	0	0	100
6.	Core Elective - III		3	3	0	0	100
7.	PEBT3PB	Practical – V Aquaculture and Marine Food Technology	3	0	0	6	100
8.	PEBT3PC	Practical – VI Environmental Biotechnology, Bioinformatics and Biostatistics	3	0	0	6	100
9.	PEBT3PA	Career Orientation Skills (Luminous Club)	1	0	1	0	100
TOTAL			25	19	1	12	-
TOTAL: 31 Periods/week + 1 Seminar							
Note: PEBT3PA: Career Orientation Skills							
Through Luminous Club, activities will be engaged and evaluations will be done by respective mentors. Activities include Organizing events such as debates, quiz, seminars etc. Evaluation will be based on Monthly reports by each student.							

SEMESTER – IV

Sl. No	SUB CODE	SUBJECT TITLE	C	L	T	P	M
	PEBT4PV	Dissertation and Viva Voce	16	0	1	24	100
	Open elective / OLC		2	2	0	0	100
	Open elective / OLC		2	2	0	0	100
TOTAL			20	0	1	24	-

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ELECTIVE COURSES

Sl. No	SUB CODE	SUBJECT TITLE	C	L	T	P	M
List of Core Elective Courses for Odd Semester:							
1	PEBTCE1	Stem Cell and Cancer Biology	3	3	Nil	Nil	100
2	PEBTCE2	Marine Bioprospecting	3	3	Nil	Nil	100
3	PEBTCE3	Techniques in Genetic Engineering	3	3	Nil	Nil	100
List of Core Elective Courses for Even Semester:							
1	PEBTCE4	Marine industrial Products and Biomaterials	3	3	Nil	Nil	100
2	PEBTCE5	Genomics and Proteomics	3	3	Nil	Nil	100
3	PEBTCE6	Enzyme Technology	3	3	Nil	Nil	100
4	PEBTCE7	Ornamental fish culture and Aquarium Maintenance	3	3	Nil	Nil	100
5	PEBTCE8	Fish Biotechnology	3	3	Nil	Nil	100
6	PEBTCE9	Coastal Aquaculture	3	3	Nil	Nil	100
List of open elective Courses (In both the semesters)							
1	PEBTO01	Microbiology for Petroleum Industry	3	3	Nil	Nil	100
2	PEBTO02	Human Nutrition and Health	3	3	Nil	Nil	100
3	PEBTO03	Biological Solutions for fouling and corrosion	3	3	Nil	Nil	100
4	PEBTO04	Biomaterials for Engineering Application	3	3	Nil	Nil	100
5	PEBTO05	Marine Pollution and Biological Solutions	3	3	Nil	Nil	100
6	PEBTO06	Commercial products from Food Processing Wastes	3	3	Nil	Nil	100
7	PEBTO07	Bioresources and renewable energy	3	3	Nil	Nil	100
8	PEBTO08	Ornamental Fish Culture	3	3	Nil	Nil	100
9	PEBTO09	Urban Farming	3	3	Nil	Nil	100
10	PEBTO10	Biology of Solid Waste Management	3	3	Nil	Nil	100
Biology for Engineers - other department courses							
1	UEMDC01	Biology for Engineers	2	2	Nil	Nil	100
Marine Environmental Production and Environmental Studies - other department courses							
1	UEBTC03	Marine Environmental Production and Environmental Studies	2	2	Nil	Nil	100
Environmental Science - other department courses							
1	UEMDC02	Environmental Science	0	2	Nil	Nil	100

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