CHOICE BASED CREDIT SYSTEM

(Applicable to all students registering from the academic year 2021-22 onwards)

Department of Mechanical Engineering

B.E - Mechanical Engineering

Curriculum & Syllabi

ACADEMY OF MARITIME EDUCATION AND TRAINING (AMET)

DECLARED AS DEEMED TO BE UNIVERSITY

135, EAST COAST ROAD

KANATHUR, CHENNAI-603112

Vision and Mission of the Institution

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

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

Vision and Mission of the Department

Vision

To develop emerging professionals through innovative Teaching Learning and Research in Marine based Mechanical Engineering for ever-changing societal needs with credibility, integrity and ethical standards.

Mission

The Vision of the Department is accomplished by the following mission statements

- Produce job ready Engineers in the field of design, manufacturing, thermal engineering by imparting basic sciences and engineering knowledge.
- Inspire students to pursue higher education in marine/mechanical related fields.
- Nurture students with creativeness, innovativeness, and entrepreneurship skills to meet the needs of the requirements of the industry.
- Establish high quality teaching and research environment to offer state-of-art under graduate, post graduate and doctoral programs.

Program Educational Objectives (PEOs)

Program Educational Objectives (PEOs) are established by means of a consultation process. PEOs are specific statements outlining the career and educational milestones that the students will accomplish within three to five years of the graduation year.

The Mechanical Engineering Program graduates will

PEO1:

Become successful Mechanical Engineers who can be competent, innovative and productive in addressing the needs of the Industry or pursue higher education & research in Mechanical Engineering and Marine based Engineering.

PEO2:

Grow professionally with their knowledge and be proficient in skills throughout their career.

PEO3:

Demonstrate high standards of ethical conduct, positive attitude and societal responsibilities.

PROGRAM OUTCOMES (PO's)

The Program of BE Mechanical Engineering has twelve Program outcomes, which is defined by the NBA and three Programs Specific Outcomes which are as follows.

PO 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities

	and norms of the engineering practice.
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO 11	**Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO'S)

PSO 1	Develop and implement new thoughts on product design and development with the help of modern computer-assisted tools, while guaranteeing effective manufacturing practices.
PSO 2	Apply engineering knowledge, design & analysis tools in various problems to resolve issues with the domains of thermal, structural, and fluid mechanics in mechanical and marine based engineering
PSO 3	Apply the latest technology of manufacturing and management practices to work professionally in industries or to become an entrepreneur

PEO / PO Mapping:

PROGRAM EDUCATIONAL OBJECTIVES	PROGRAM OUTCOMES											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
PEO01	√	√	√	√	√	√	√	√	√	√	√	√
PEO02	√	√	√	√	√	√	√	√	√	√	√	√
PEO03						√	√	√	√	√	√	√

AMET
ACADEMY OF MARITIME EDUCATION AND TRAINING
DEEMED TO BE UNIVERSITY
(Under Section 3 of UGC Act 1956)

CBCS CURRICULUM (2020-21)

DEPARTMENT OF MECHANICAL ENGINEERING
CURRICULUM FOR B.E. (Mechanical Engineering)
ACADEMIC YEAR - 2021-2022
SEMESTER I

S. No	Course Code	Category	Course Title	Contact Hours	L	T	P	C
THEORY								
1	**UEMDC01**	**Mandatory Course 1**	**Induction Training (UHV - 1)**	**3 weeks**	**0**	**0**	**0**	**0**
2	**UELEC01**	**Humanities and Social Science including Management Courses**	**Technical English I**	**2**	**2**	**0**	**0**	**2**
3	**UEPHC01**	**Basic Science Course**	**Engineering Physics I**	**3**	**3**	**0**	**0**	**3**
4	**UEMTC01**	**Basic Science Course**	**Engineering Mathematics I**	**4**	**3**	**1**	**0**	**4**
5	**UECHC01**	**Engineering Science Course**	**Engineering Chemistry**	**4**	**4**	**0**	**0**	**4**
PRACTICALS								
6	**UELECPA**	**Humanities and Social Science including Management Courses**	**Communication Skills Laboratory - I**	**2**	**0**	**0**	**2**	**1**
7	**UEPHCPA**	**Engineering Science Course**	**Engineering Physics Laboratory**	**2**	**0**	**0**	**2**	**1**
8	**UECHCPA**	**Engineering Science Course**	**Engineering Chemistry Laboratory**	**2**	**0**	**0**	**2**	**1**
9	**UEWSCPA**	**Engineering Science Course**	**Workshop Practices I**	**4**	**0**	**0**	**4**	**2**
TOTAL				**23**	**12**	**1**	**10**	**18**

*L- Lecture; T-Tutorial; P-Practical; C-Credit

SEMESTER II

S. No	Course Code	Category	Course Title	Contact Hours	L	T	P	C
THEORY								
1.	**UEEEC01**	**Engineering Science Course**	**Basic Electrical Engineering**	**3**	**3**	**0**	**0**	**3**
2.	**UEPHC02**	**Basic Science Course**	**Engineering Physics II**	**2**	**2**	**0**	**0**	**2**
3.	**UEMTC02**	**Basic Science Course**	**Engineering Mathematics II**	**4**	**3**	**1**	**0**	**4**
4.	**UEITC01**	**Engineering Science Course**	**Python for Problem Solving**	**3**	**3**	**0**	**0**	**3**
5	**UEMDC02**	**Mandatory Course 2**	**Environmental Science**	**2**	**2**	**0**	**0**	**0**
6	**UEMDC03**	**Mandatory Course 3**	**Gender Sensitivity**	**2**	**2**	**0**	**0**	**0**
PRACTICALS								
7	**UELECPB**	**Humanities and Social Science including Management Courses**	**Communication Skills Laboratory - II**	**2**	**0**	**0**	**2**	**1**
8	**UEEECPA**	**Engineering Science Course**	**Basic Electrical Engineering Laboratory**	**2**	**0**	**0**	**2**	**1**
9	**UEITCPA**	**Engineering Science Course**	**Python for Problem Solving Laboratory**	**2**	**0**	**0**	**2**	**1**
10	**UEMCCPA**	**Engineering Science Course**	**Engineering Drawing & Computer Graphics**	**5**	**1**	**0**	**4**	**3**
TOTAL				**27**	**16**	**1**	**10**	**18**

*L- Lecture; T-Tutorial; P-Practical; C-Credit

SEMESTER III

S. No	Course Code	Category	Course Title	Contact Hours	L	T	P	C
THEORY								
1.	**UEMTC03**	**Basic Science Course**	**Engineering Mathematics III**	**4**	**3**	**1**	**0**	**4**
2.	**UEBTC01**	**Basic Science Course**	**Biology for Engineers**	**3**	**3**	**0**	**0**	**3**
3.	**UEMCC01**	**Engineering Science Course**	**Engineering Mechanics**	**3**	**3**	**0**	**0**	**3**
4.	**UEEEMC1**	**Engineering Science Course**	**Electrical Drives and Control**	**3**	**3**	**0**	**0**	**3**
5.	**UEMC301**	**Professional Core Course**	**Applied Thermodynamics**	**4**	**3**	**1**	**0**	**4**
6.	**UEMC302**	**Professional Core Course**	**Materials and Manufacturing Technology**	**3**	**3**	**0**	**0**	**3**
7	**UEMDC04**	**Mandatory Course 4**	**Constitution of India**	**2**	**2**	**0**	**0**	**0**
PRACTICALS								
8	**UEMC3PA**	**Professional Core Course**	**Computer aided drafting Laboratory**	**2**	**0**	**0**	**2**	**1**
9	**UEMC3PB**	**Professional Core Course**	**Manufacturing Technology Laboratory**	**2**	**0**	**0**	**2**	**1**
10	**UEMC3PC**	**Professional Core Course**	**Electrical Drives and Control Laboratory**	**2**	**0**	**0**	**2**	**1**
11	**UELECPC**	**Humanities and Social Science including Management Courses**	**Interpersonal Communication**	**2**	**0**	**0**	**2**	**1**
12	**UEVCC01**	**Employment Opportunity Course**	**Value Added Course – I**	**2**	**-**	**-**	**2**	**-**
13	**UESDC01**	**Employment Opportunity Course**	**Skill Development Programme - 1**	**2**	**-**	**-**	**2**	**-**
TOTAL				**34**	**20**	**2**	**12**	**24**

*L- Lecture; T-Tutorial; P-Practical; C-Credit

SEMESTER IV

S. No	Course Code	Category	Course Title	Contact Hours	L	T	P	C
THEORY								
1.	**UEMTC04**	**Basic Science Course**	**Mathematical Foundation for Data Science and Artificial Intelligence**	**2**	**2**	**0**	**0**	**2**
2	**UEMC401**	**Professional Core Course**	**Thermal Engineering**	**3**	**3**	**0**	**0**	**3**
3	**UEMC402**	**Professional Core Course**	**Strength of Materials and Fluid Mechanics**	**3**	**3**	**1**	**0**	**4**
4	**UEMC403**	**Professional Core Course**	**Automobile Engineering**	**3**	**3**	**0**	**0**	**3**
5.	**UEMC404**	**Professional Core Course**	**Design of Machine Elements**	**3**	**3**	**0**	**0**	**3**
6		**Open Elective Course**	**OEC-1**	**3**	**3**	**0**	**0**	**3**
7	**UEMDC05**	**Mandatory Course 5**	**Essence of Indian Knowledge & Tradition**	**2**	**2**	**0**	**0**	**0**
PRACTICALS								
8	**UEMC4PA**	**Professional Core Course**	**Thermal Engineering Laboratory**	**2**	**0**	**0**	**2**	**1**
9	**UEMC4PB**	**Professional Core Course**	**Strength of Materials & Fluid Mechanics Laboratory**	**2**	**0**	**0**	**2**	**1**
10	**UEMC4PC**	**Professional Core Course**	**Computer aided Modelling Laboratory**	**2**	**0**	**0**	**2**	**1**
11	**UELECPD**	**Humanities and Social Science including Management Courses**	**Professional Communication**	**2**	**0**	**0**	**2**	**1**
12	**UEVCC02**	**Employment Opportunity Course**	**Value Added Course - II**	**2**	**-**	**-**	**2**	**-**
13	**UESDC02**	**Employment Opportunity Course**	**Skill Development Programme – II**	**2**	**-**	**-**	**2**	**-**
TOTAL				**31**	**19**	**1**	**12**	**22**

*L- Lecture; T-Tutorial; P-Practical; C-Credit

SEMESTER V

S. No	Course Code	Category	Course Title	Contact Hours	L	T	P	C
THEORY								
1.	UEITC02	Engineering Science Course	Data Science	3	3	0	0	3
2	UEMDC06	Humanities and Social Science including Management Courses	Universal Human Values	3	3	0	0	3
3	UEMC501	Professional Core Course	Heat and Mass transfer	4	3	1	0	4
4	UEMC502	Professional Core Course	Mechatronics	3	3	0	0	3
5		Professional Elective Course 1	PEC 1	3	3	0	0	3
6		Open Elective Course 2	OEC 2	3	3	0	0	3
PRACTICALS								
7	UEMC5PA	Professional Core Course	Heat and Mass transfer Laboratory	2	0	0	2	1
8	UEMC5PB	Professional Core Course	Computer aided Design and Analysis Laboratory	2	0	0	2	1
9	UEMC5PC	Professional Core Course	Automobile Maintenance Laboratory	2	0	0	2	1
10	UEMC5PD	Internship	Internship - I	0	0	0	0	1
11	UEVCC03	Employment Opportunity Course	Value Added Course - III	2	-	-	2	-
12	UESDC03	Employment Opportunity Course	Skill Development Programme - III	2	-	-	2	-
TOTAL				29	18	1	10	23

*L- Lecture; T-Tutorial; P-Practical; C-Credit

SEMESTER VI

S. No	Course Code	Category	Course Title	Contact Hours	L	T	P	C
THEORY								
1.	UEITC03	Engineering Science Course	Artificial Intelligence	3	3	0	0	3
2	UEMC601	Professional Core Course	Mechanics of Machines	4	3	1	0	4
3.	UEMC602	Professional Core Course	Industrial Automation	3	3	0	0	3
4	UEMC603	Professional Core Course	Robotics	3	3	0	0	3
5		Professional Elective Course 2	PEC 2	3	3	0	0	3
6		Open Elective Course 3	OEC 3	3	3	0	0	3
PRACTICALS								
7	UEMC6PA	Professional Core Course	CNC Programming and Practice Laboratory	2	0	0	2	1
8	UEMC6PB	Professional Core Course	Industrial Automation Laboratory	2	0	0	2	1
9	UEMC6PC	Project	Project Fabrication Laboratory	4	0	0	4	2
10	UEVCC04	Employment Opportunity Course	Value Added Course – IV	2	-	-	2	-
11	UESDC04	Employment Opportunity Course	Skill Development Programme - IV	2	-	-	2	-
TOTAL				31	18	1	12	23

*L- Lecture; T-Tutorial; P-Practical; C-Credit

SEMESTER VII

S. No	Course Code	Category	Course Title	Contact Hours	L	T	P	C
THEORY								
1.	UEMC701	Professional Core Course	Internet of Things	3	3	0	0	3
2.	UEMC702	Professional Core Course	Electric Vehicle Technology	3	3	0	0	3
3	UEMC703	Professional Core Course	Start Up Management	3	3	0	0	3
4		Professional Elective Course 3	PEC 3	3	3	0	0	3
5		Professional Elective Course 4	PEC 4	3	3	0	0	3
6.		Open Elective Course 4	OEC 4	3	3	0	0	3
PRACTICALS								
7	UEMC7PA	Professional Core Course	Internet of Things Laboratory	2	0	0	0	1
8	UEMC7PB	Project	PROJECT WORK - Phase 1	4	0	0	4	2
9	UEMC7PC	Internship	Internship - II	0	0	0		1
10	UEVCC05	Employment Opportunity Course	Value Added Course - V	2	-	-	2	-
11	UESDC05	Employment Opportunity Course	Skill Development Programme - V	2	-	-	2	-
TOTAL				28	18	0	8	22

*L- Lecture; T-Tutorial; P-Practical; C-Credit

SEMESTER VIII

S. No	Course Code	Category	Course Title	Contact Hours	L	T	P	C
THEORY								
1.		**Professional Elective Course**	**PEC 5**	**3**	**3**	**0**	**0**	**3**
2.		**Professional Elective Course**	**PEC 6**	**3**	**3**	**0**	**0**	**3**
PRACTICALS								
3.	UEMC8PA	**Project**	**Project Work - Phase 2**	**14**	**0**	**0**	**14**	**7**
TOTAL				**20**	**6**	**0**	**14**	**13**

*L- Lecture; T-Tutorial; P-Practical; C-Credit

List of professional elective courses (PEC) offered by the Department

Sl. No.	Course Code	Title of the PEC	Contact Hours	L	T	P	C
		PEC1					
1	UEMCE01	Alternate Fuels	3	3	0	0	3
2	UEMCE02	Design of Transmission system	3	3	0	0	3
3	UEMCE03	Computer Integrated Manufacturing	3	3	0	0	3
4	UEMCE04	SWAYAM/ MOOC Courses	3	3	0	0	3
		PEC2					
1	UEMCE05	Fuels and Combustion	3	3	0	0	3
2	UEMCE06	Finite Element Analysis	3	3	0	0	3
3	UEMCE07	Welding Engineering	3	3	0	0	3
4	UEMCE08	SWAYAM/ MOOC Courses	3	3	0	0	3
		PEC3					
1	UEMCE09	Power Plant Engineering	3	3	0	0	3
2	UEMCE10	Engineering Failure Analysis	3	3	0	0	3
3	UEMCE11	Automobile Electronics	3	3	0	0	3
4	UEMCE12	SWAYAM/ MOOC Courses	3	3	0	0	3
		PEC4					
1	UEMCE13	Refrigeration and Air Conditioning	3	3	0	0	3
2	UEMCE14	Design of Jigs and Fixtures	3	3	0	0	3
3	UEMCE15	Rapid Manufacturing Technology	3	3	0	0	3
4	UEMCE16	SWAYAM/ MOOC Courses	3	3	0	0	3
		PEC5					
1	UEMCE17	Advanced Internal Combustion Engines	3	3	0	0	3
2	UEMCE18	Product Design for Manufacturing	3	3	0	0	3
3	UEMCE19	TQM and Reliability	3	3	0	0	3
4	UEMCE20	SWAYAM/ MOOC Courses	3	3	0	0	3
		PEC 6					
1	UEMCE21	Solar and Wind Energy systems	3	3	0	0	3
2	UEMCE22	Design of Work Systems	3	3	0	0	3
3	UEMCE23	Operation Research	3	3	0	0	3
4	UEMCE24	SWAYAM/ MOOC Courses	3	3	0	0	3

List of open elective courses (OEC) offered by Mechanical Department

IV Sem

Sl. No.	Course Code	Title of the OEC1	Contact Hours	L	T	P	C
1	UEMCO01	Industrial Robotics	3	3	0	0	3
2	UEMCO02	Alternative Sources of Energy	3	3	0	0	3
3	UEMCO03	Introduction to Fluid Power Systems	3	3	0	0	3

V Sem

Sl. No.	Course Code	Title of the OEC2	Contact Hours	L	T	P	C
1	UEMCO04	Industrial Automation	3	3	0	0	3
2	UEMCO05	Non Destructive Testing	3	3	0	0	3
3	UEMCO06	Engineering Instruments and Measurements	3	3	0	0	3

VI Sem

Sl.No.	Course Code	Title of the OEC3	Contact Hours	L	T	P	C
1	UEMCO07	Six Sigma	3	3	0	0	3
2	UEMCO08	Renewable Energy Sources	3	3	0	0	3
3	UEMCO09	Smart Materials	3	3	0	0	3

VII Sem

Sl.No.	Course Code	Title of the OEC4	Contact Hours	L	T	P	C
1	UEMCO10	Automotive Engineering	3	3	0	0	3
2	UEMCO11	Supply Chain Management	3	3	0	0	3
3	UEMCO12	Industrial Engineering	3	3	0	0	3

COMMON FRAME WORK FOR CURRICULUM DEVELOPMENT
AMET CURRICULUM – CREDIT SHARE

Semester	Contact Hours	Lecture	Tutorial	Practical	Credits
Semester 1	23	12	1	10	18
Semester 2	27	16	1	10	18
Semester 3	34	20	2	12	24
Semester 4	31	19	1	12	22
Semester 5	29	18	1	10	23
Semester 6	31	18	1	12	23
Semester 7	28	18	0	8	22
Semester 8	20	6	0	14	13
Total	223	127	7	88	163

Humanities	Basic Science	Engineering Science	Professional Core	Professional Elective	Open Elective	Project /Internship	Total
9	**22**	**31**	**58**	**18**	**12**	**13**	**163**