



**CURRICULUM
2023
(Autonomous)
Version 1.0**

**B.TECH
Mechanical Engineering**



CURRICULUM

FOR

B. TECH DEGREE PROGRAMME IN **MECHANICAL ENGINEERING**

(SEMESTERS I TO VIII)

2023 SCHEME
(AUTONOMOUS)



MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Autonomous Institution Affiliated to APJ Abdul Kalam Technological University)
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MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

B.TECH DEGREE PROGRAMME

IN

MECHANICAL ENGINEERING

CURRICULUM

Dates of Approval

Board of Studies (BOS): 12.07.2023

Academic Council : 09.08.2023

Head of Department
Chairman, Board of Studies

Principal
Chairman, Academic Council

MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

Vision and Mission of the Institution

Vision:

To be an Institution moulding globally competent professionals as epitomes of Noble Values.

Mission:

To transform the Youth as technically competent, ethically sound and socially committed professionals, by providing a vibrant learning ambience for the welfare of humanity.

DEPARTMENT OF MECHANICAL ENGINEERING

Vision and Mission of the Department

Vision:

To be a Centre of Excellence in education and research, imparting ethical values for the betterment of mankind.

Mission:

To impart Technical Knowledge and Values through continuous training and research for the overall development of the stakeholders.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates will be Engineering Professionals, Innovators or Entrepreneurs engaged in Technology Development or implementation of Engineering Systems in Industry.

PEO2: Graduates will be successful in pursuing higher studies or research in Engineering or Management Studies.

PROGRAMME OUTCOMES (POs)

Engineering graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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.
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.
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.
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.
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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.

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.
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.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

Engineering Graduates will have the ability to:

- PSO1:** Apply the concepts of solid mechanics in the design of mechanical engineering systems.
- PSO2:** Apply knowledge of thermal and fluid Sciences to solve engineering problems.
- PSO3:** Use simulation tools and computer integrated systems in mechanical engineering.
- PSO4:** Apply advanced manufacturing processes and modern industrial management techniques in engineering.

DEPARTMENT OF MECHANICAL ENGINEERING

B.Tech. Programme in Mechanical Engineering

For the students admitted from 2023-24

Scheduling of Courses

i) Knowledge Segments and Credits

Every course of BTech Programme is placed in one of the nine categories as listed in table below. No semester shall have more than six lecture-based courses and two laboratory courses, and/or drawing/seminar/project courses in the curriculum.

Table 1: Credit distribution and the Knowledge Domains

Sl. No.	Category	Category Code	Total credits
1	Humanities and Social Sciences including Management Courses	HSC	6
2	Basic Science Courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Programme Core Courses, Comprehensive Course Work and Viva Voce	PCC	70
5	Programme Elective Courses	PEC	18
6	Institute Elective Courses	OEC	6
7	Project Work and Seminar	PWS	12
8	Mandatory Non-credit Courses (P/F) with Grade	MNC	---
9	Mandatory Student Activities (P/F)	MSA	3
Total Mandatory Credits			163
Value Added Courses (Optional) – Honours/Minor		VAC	15

ii) Semester-wise Credit Distribution

<i>Semester</i>	I	II	III	IV	V	VI	VII	VIII	<i>Total Credits</i>
<i>Credits for Courses</i>	17	21	21	21	22	21	21	16	160
<i>Credits for Activities</i>	3								3
<i>Total Credits</i>									163
<i>Value Added Courses (Optional) – Honours / Minor</i>									15
<i>Total Credits</i>									178

Semester I						
Slot	Course Code	Category	Course Name	L-T-P-J	Hours	Credits
A	23MAL10A	BSC	Linear Algebra and Calculus	3-1-0-0	4	4
B	23CYL10A	BSC	Engineering Chemistry	3-1-0-0	4	4
C	23ESB10A	ESC	Engineering Graphics	2-0-2-0	4	3
E	23ESL10M	ESC	Basics of Mechanical Engineering	2-0-0-0	2	2
	23ESL10N	ESC	Basics of Civil Engineering	2-0-0-0	2	2
G	23NCL10A	MNC	Environmental Science	2-0-0-0	2	---
S	23CYP10A	BSC	Engineering Chemistry Lab	0-0-2-0	2	1
T	23ESP10A	ESC	Manufacturing and Construction Practices A	0-0-2-0	2	1
Total					22	17

Semester II						
Slot	Course Code	Category	Course Name	L-T-P-J	Hours	Credits
A	23MAL10B	BSC	Vector calculus, Differential equations and Transforms	3-1-0-0	4	4
B	23PYL10A	BSC	Engineering Physics	3-1-0-0	4	4
C	23ESL10C	ESC	Engineering Mechanics	2-1-0-0	3	3
D	23ESB10D	ESC	Problem Solving and Programming in C	2-1-2-0	5	4
E	23ESL10J	ESC	Basics of Electrical Engineering A	2-0-0-0	2	2
	23ESL10L	ESC	Basics of Electronics Engineering	2-0-0-0	2	2
G	23NCJ10B	MNC	Professional communication	2-0-0-2	4	---
S	23PYP10A	BSC	Engineering Physics Lab	0-0-2-0	2	1
T	23ESP10B	ESC	Electrical and Electronics workshop	0-0-2-0	2	1
Total					28	21

Semester III						
Slot	Course Code	Category	Course Name	L-T-P-J	Hours	Credits
A	23MAL20A	BSC	Partial Differential Equations and Complex Analysis	3-1-0-0	4	4
B	23MEL20A	PCC	Mechanics of Solids	3-1-0-0	4	4
C	23MEL20B	PCC	Engineering Thermodynamics	2-1-0-0	3	3
D	23MEL20C	PCC	Metallurgy and Material Science	3-1-0-0	4	4
E	23MEL20D	PCC	Mechanics of Fluids	2-1-0-0	3	3
F	23MEB20E	PCC	Computer Aided Machine Drawing	1-0-2-0	3	2
G	23NCL20A	MNC	Professional Ethics	2-0-0-0	2	---
T	23MEP20A	PCC	Material Testing Lab	0-0-2-0	2	1
M		VAC	Remedial/Minor Course			
Total					25	21

Semester IV						
Slot	Course Code	Category	Course Name	L-T-P-J	Hours	Credits
A	23MAL20D	BSC	Probability, Statistics and Numerical Methods	3-1-0-0	4	4
B	23MEL20F	PCC	Mechanics of Machinery	3-1-0-0	4	4
C	23MEL20G	PCC	Fluid Machinery	3-1-0-0	4	4
D	23MEL20H	PCC	Manufacturing Processes	3-1-0-0	4	4
E	23HSL20A	HSC	Universal Human Values II	3-0-0-0	3	3
G	23NCL20B	MNC	Industrial Safety Engineering	2-1-0-0	3	---
S	23MEP20B	PCC	Hydraulic Machines Lab	0-0-2-0	2	1
T	23MEP20C	PCC	Machine Tools Lab	0-0-2-0	2	1
M/H		VAC	Remedial/Minor/Honours Course			
Total					26	21

Semester V						
Slot	Course Code	Category	Course Name	L-T-P-J	Hours	Credits
A	23MEL30A	PCC	Design of Machine Elements I	3-1-0-0	4	4
B	23MEL30B	PCC	Thermal Engineering	3-1-0-0	4	4
C	23MEJ30C	PCC	Machine Tools and Metrology	2-1-0-2	5	4
D	23MEL30D	PCC	Production & Operations Management	3-0-0-0	3	3
F	23MEL31X	PEC	Program Elective I (Management Courses)	3-0-0-0	3	3
E	23ESL00A	ESC	Design Engineering	2-0-0-0	2	2
S	23MEP30A	PCC	Metrology and Instrumentation Lab.	0-0-2-0	2	1
T	23MEP30B	PCC	Thermal Engineering Lab	0-0-2-0	2	1
M/H		VAC	Remedial/Minor/Honours Course			
Total					25	22

Semester VI						
Slot	Course Code	Category	Course Name	L-T-P-J	Hours	Credits
A	23MEJ30E	PCC	Heat and Mass Transfer	2-1-0-2	5	4
B	23MEB30F	PCC	Computer Aided Design and FEM	3-0-2-0	5	4
C	23MEL30G	PCC	Mechatronics & Control Systems	3-1-0-0	4	4
E	23IEL31X	IEC	Institute Elective I	3-0-0-0	3	3
F	23HSL30A	HSC	Business Economics & Accounting	3-0-0-0	3	3
S	23MEP30C	PCC	Heat Transfer Lab	0-0-2-0	2	1
T	23MES38A	PWS	Seminar	0-0-4-0	4	2
M/H		VAC	Remedial/Minor/Honours Course			
Total					26	21

Semester VII						
Slot	Course Code	Category	Course Name	L-T-P-J	Hours	Credits
A	23MEJ40A	PCC	Design of Machine Elements II	2-1-0-2	5	4
B	23MEL40B	PCC	Robotics & Automation	3-1-0-0	4	4
C	23MEL42X	PEC	Program Elective II	3-0-0-0	3	3
D	23MEL43X	PEC	Programme Elective - III	3-0-0-0	3	3
E	23IEL42X	IEC	Institute Elective II	3-0-0-0	3	3
S	23MEP40A	PCC	Mechanical Engineering Lab	0-0-2-0	2	1
T	23MEV48A	PWS	Comprehensive Viva Voce	0-0-2-0	2	1
U	23MEJ48B	PWS	Project Phase I	0-0-0-4	4	2
M/H		VAC	Remedial/Minor/Honours Course			
Total					26	21

Semester VIII						
Slot	Course Code	Category	Course Name	L-T-P-J	Hours	Credits
A	23MEL44X	PEC	Programme Elective - IV (Management Course)	3-0-0-0	3	3
B	23MEL45X	PEC	Programme Elective - V	3-0-0-0	3	3
C	23MEL46X	PEC	Programme Elective - VI	3-0-0-0	3	3
U	23MEJ48C	PWS	Project Phase II	0-0-0-12	12	6
V	23MEI48D	PWS	Internship			1
M/H		VAC	Remedial/Minor/Honours Course			
Total					21	16