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B.E. (MECHANICAL ENGINEERING)

(Approved by AICTE)

I to VIII Semester

CURRICULUM AND SYLLABI

UNDER CHOICE BASED CREDIT SYSTEM

Effective from the Academic Year 2023-2024

SEMESTERWISE COURSES

L-LECTUREHOURS,T–TUTORIALHOURS,P–PRACTICALHOURS,C–CREDITS.

Semester I								
S.no.	**Course Code**	**Course Type**	**Category**	**Course Name**	**L**	**T**	**P**	**C**
1	BMA121	Theory	BSC	Algebra and Calculus	3	1	0	4
2	BPH121	Theory+Lab	BSC	Engineering Physics	3	0	2	4
3	BCY121	Theory+Lab	BSC	Engineering Chemistry	3	0	2	4
4	BEN121	Theory+Lab	HSC	English for Engineers	3	0	2	4
5	BME121	Theory	ESC	Engineering Graphics	2	1	0	3
6	BCS121	Theory	ESC	Fundamentals of Computing and Python Programming	3	0	0	3
7	BCS107	Practical	ESC	Python Programming Laboratory	0	0	4	2
Total Credits					**17**	**2**	**10**	**24**
Semester 2								
S.no.	**Course Code**	**Course Type**	**Category**	**Course Name**	**L**	**T**	**P**	**C**
1	BMA131	Theory	BSC	Partial Differential Equations and Transforms	3	1	0	4
2	BEE131	Theory	ESC	Basic Electrical and Instrumentation Engineering	3	0	0	3
3	BBO131	Theory	BSC	Environmental Science	2	0	0	2
4	BME111	Theory	PCC	Engineering Mechanics	3	1	0	4
5	BME112	Theory	PCC	Engineering Thermodynamics	3	1	0	4
6	BCS131	Theory+Lab	ESC	C Programming and Data Structures	2	0	2	3
7	BME117	Practical	ESC	Engineering Practices	0	0	4	2
8	BEO131	Theory	MAC	Indian Constitution and Human Rights	0	0	0	0
9		Theory	VAC	Value Added Course-I	0	0	0	0
Total Credits					17	1	10	**22**

Semester 3								
S.no.	**Course Code**	**Course Type**	**Category**	**Course Name**	**L**	**T**	**P**	**C**
1	BMG241	Theory + Project	HSC	Engineering Economics and Management	2	0	2	3
2	BMA244	Theory	BSC	Numerical Methods	3	1	0	4
3	BME201	Theory	PCC	Manufacturing Technology- I	3	0	0	3
4	BME202	Theory	PCC	Engineering Materials and Metallurgy	3	0	0	3
5	BME203	Theory	PCC	Mechanics of Solids	3	1	0	4
6	BME221	Theory+Lab	ESC	Fluid Mechanics and Machinery	3	0	2	4
7	BEN221	Skill	EEC	Essential skills and Aptitude for Engineers	0	0	2	1
8	BME207	Practical	PCC	Manufacturing Technology Laboratory	0	0	4	2
Total Credits					**17**	**2**	**10**	**24**
Semester 4								
S.no.	**Course Code**	**Course Type**	**Category**	**Course Name**	**L**	**T**	**P**	**C**
1	BME211	Theory+Lab	PCC	Thermal Engineering	3	0	2	4
2	BME212	Theory	PCC	Manufacturing Technology- II	3	0	0	3
3	BME213	Theory	PCC	Design of Machine Elements	3	0	0	3
4	BME214	Theory	PCC	Automobile Engineering	3	0	0	3
5	BME215	Theory	PCC	Kinematics of Machinery	3	0	0	3
6	BME217	Practical	PCC	Mechanics of Solids Laboratory	0	0	4	2
7	BEN231	Skill	EEC	Communication skills for career success	0	0	2	1
8	BEO231	Theory	MAC	Indian Knowledge System	2	0	0	2
9		Theory	VAC	Value Added Course-2	0	0	0	0
Total Credits					17	0	8	21

Summer Internships (6-8 weeks) is mandatory during the summer vacation in between semester IV and V for each student to continue the programme and the corresponding valuation will take place in the semester VII

Semester 5

S.no.	Course Code	Course Type	Category	Course Name	L	T	P	C
1	BME301	Theory + Project	PCC	Design of Transmission Systems	3	0	2	4
2	BME302	Theory	PCC	Dynamics of Machines	3	0	0	3
3	BME303	Theory	PCC	Metrology and Measurements	3	0	0	3
4		Theory	PEC	Professional Elective 1	3	0	0	3
6		Theory	PEC	Professional Elective 2	3	0	0	3
7		Theory	OEC	Open Elective 1	3	0	0	3
8	BME309	Skill	EEC	Internship	0	0	2	1
9	BME307	Practical	PCC	Dynamics and Metrology Laboratory	0	0	4	2
10	BEN321	Skill	EEC	Leadership skills and Personality Development	0	0	2	1
Total Credits					**18**	**0**	**10**	**23**

Semester 6

S.no.	Course Code	Course Type	Category	Course Name	L	T	P	C
1	BME311	Theory	PCC	Computer Aided Design	3	0	0	3
2	BME312	Theory+Lab	PCC	Heat and Mass Transfer	3	0	2	4
3	BME313	Theory	PCC	Hydraulics and Pneumatics	3	0	0	3
4		Theory	PEC	Professional Elective 3	3	0	0	3
5		Theory	PEC	Professional Elective 4	3	0	0	3
6		Theory	OEC	Open Elective 2	3	0	0	3
7	BME317	Practical	PCC	CAD/CAM Laboratory	0	0	4	2

8	BME320	Project	EEC	Design Thinking and Innovations	0	0	4	2
9		Theory	VAC	Value Added Course-3	0	0	0	0
Total Credits					**18**	**0**	**10**	**23**

Summer Internships (6-8 weeks) is mandatory during the summer vacation in between semester VI and VII for each student to continue the programme and the corresponding valuation will take place in the next semester (semester VII).

Semester 7

S.no.	**Course Code**	**Course ype**	**Category**	**Course Name**	**L**	**T**	**P**	**C**
1	BME401	Theory+Lab	PCC	Mechatronics	3	0	2	4
2		Theory	PEC	Professional Elective 5	3	0	0	3
3		Theory	HSC	Humanities Elective -2	2	0	0	2
4	BME417	Practical	PCC	Geometric Modelling and Simulation Laboratory	0	0	4	2
5	BME409	Skill	EEC	Internship	0	0	2	1
6	BME410	Project	EEC	Project Work (Phase-I)	0	0	12	6
7		Theory	VAC	Value Added Course-4	0	0	0	0
Total Credits					**8**	**0**	**22**	**19**

Semester 8

S.no.	**Course Code**	**Course type**	**Category**	**Course Name**	**L**	**T**	**P**	**C**
1	BME420	Project	EEC	Project Work (Phase-II)	0	0	24	12
2			OEC	Mooc courses*	3	0	0	3
Total Credits					**3**	**0**	**24**	**15**
					Total credits			**171**

MATHEMATICS ELECTIVE								
Sl.no	**Category**	**Course Code**	**Course Title**	**Periods per week**				**Credits**
				L	**T**	**P**	**EL**	
1.	BS	BMA241	Discrete Mathematics	3	1	0	0	4
2.	BS	BMA242	Probability and Statistics	3	1	0	0	4
3.	BS	BMA243	Random Processes	3	1	0	0	4
4.	BS	BMA244	Numerical Methods	3	1	0	0	4

HUMANITIES ELECTIVE I								
Sl.no	**Category**	**Course Code**	**Course Title**	**Periods per week**				**Credits**
				L	**T**	**P**	**EL**	
1.	HS	BMG241	Engineering Economics and Management	2	0	0	0	2
2.	HS	BEO242	Sociology of Science and Technology	2	0	0	0	2
3.	HS	BEO243	Industrial Economics and Management	2	0	0	0	2
4.	HS	BEO244	Dynamics of Indian Social Structure	2	0	0	0	2
5.	HS	BEO245	Management for Engineers	2	0	0	0	2
6.	HS	BEO246	Human Values and Ethics	2	0	0	0	2

HUMANITIES ELECTIVE II								
Sl.no	**Category**	**Course Code**	**Course Title**	**Periods per week**				**Credits**
				L	**T**	**P**	**EL**	
1.	HS	BEO441	Economics of Sustainable Development	2	0	0	0	2
2.	HS	BEO442	Sociology of Industrial Relations.	2	0	0	0	2
3.	HS	BEO443	Professional Ethics and Human Values	2	0	0	0	2
4.	HS	BEO444	Gender, Technology and Development	2	0	0	0	2
6	HS	BEO445	Professional Ethics for Engineers	2	0	0	0	2

(i) Programme Core courses (PC) belonging to the Major Programme ofstudy.

S.No.	**Course Code**	**Course type**	**Course Name**	**L**	**T**	**P**	**Credit**
1	BME111	Theory	Engineering Mechanics	3	1	0	4
2	BME112	Theory	Engineering Thermodynamics	3	1	0	4
3	BME201	Theory	Manufacturing Technology- I	3	0	0	3
4	BME202	Theory	Engineering Materials and Metallurgy	3	0	0	3
5	BME203	Theory	Mechanics of Solids	3	1	0	4
6	BME207	Practical	Manufacturing Technology Laboratory	0	0	4	2
7	BME211	Theory+Lab	Thermal Engineering	3	0	2	4
8	BME212	Theory	Manufacturing Technology-II	3	0	0	3
9	BME213	Theory	Design of Machine Elements	3	0	0	3
10	BME214	Theory	Automobile Engineering	3	0	0	3
11	BME215	Theory	Kinematics of Machinery	3	0	0	3
12	BME217	Practical	Mechanics of Solids Laboratory	0	0	4	2
13	BME301	Theory + Project	Design of Transmission Systems	3	0	2	4
14	BME302	Theory	Dynamics of Machines	3	0	0	3
15	BME303	Theory	Metrology and Measurements	3	0	0	3
16	BME307	Practical	Dynamics and Metrology Laboratory	0	0	4	2

17	BME311	Theory	Computer Aided Design	3	0	0	3
18	BME312	Theory+Lab	Heat and Mass Transfer	3	0	2	4
19	BME313	Theory	Hydraulics and Pneumatics	3	0	0	3
20	BME317	Practical	CAD/CAM Laboratory	0	0	4	2
21	BME401	Theory+Lab	Mechatronics	3	0	2	4
22	BME417	Practical	Geometric Modelling and Simulation Laboratory	0	0	4	2

(ii) **Programme Electives (PE)** offered by the Department related to the Major Programme ofstudy.

A student should choose at least 6 courses during the programme.

STREAM A: DESIGN

Sl.no	Course Code	Course Title	Periods per week			Credits
			L	T	P	
1	BME341	Design for Manufacturing	3	0	0	3
2	BME342	Product Design and Development	3	0	0	3
3	BME343	Modern Concepts of Engineering Design	3	0	0	3
4	BME344	Dynamics and Control	3	0	0	3
5	BME345	Mechanical Vibrations and Noise Control	3	0	0	3
6	BME441	Applied Finite Element Analysis	3	0	0	3
7	BME442	Design of Jigs, Fixtures and Press Tools	3	0	0	3
8	BME443	Tribology In Design	3	0	0	3
9	BME444	Design of Heat Exchangers	3	0	0	3
10	BME445	Computational Techniques for Fluid Dynamics	3	0	0	3

STREAM B: PRODUCTION AND INDUSTRIAL ENGINEERING

Sl.no	Course Code	Course Title	Periods per week			Credits
			L	T	P	
1	BME351	3D Printing and Design	3	0	0	3

2	BME352	Micro and Nano Machining	3	0	0	3
3	BME353	Unconventional Machining Techniques	3	0	0	3
4	BME354	Non-destructive Evaluation of Materials	3	0	0	3
5	BME355	Casting and Welding Processes	3	0	0	3
6	BME356	Process Planning and Cost Estimation	3	0	0	3
7	BME357	Computer Integrated manufacturing	3	0	0	3
8	BME451	Maintenance Engineering	3	0	0	3
9	BME452	Production Planning and Control	3	0	0	3
10	BME453	Safety in Process Industries	3	0	0	3
11	BME454	Quality and Reliability Engineering	3	0	0	3
12	BME455	Precision Manufacturing	3	0	0	3
13	BME456	Lean Six Sigma	3	0	0	3
14	BME457	Enterprise Resource Planning	3	0	0	3

STREAM C: THERMAL ENGINEERING

Sl.no	**Course Code**	**Course Title**	**Periods per week**			**Credits**
			L	**T**	**P**	
1	BME361	Refrigeration and Air Conditioning	3	0	0	3
2	BME362	Turbo Machinery	3	0	0	3
3	BME363	Advanced Internal Combustion Engineering	3	0	0	3
4	BME364	Biofuels	3	0	0	3
5	BME365	Energy Efficient Mechanical Systems For Buildings	3	0	0	3
6	BME366	Gas Dynamics for Space Propulsion	3	0	0	3
7	BME461	Solar Energy Technology	3	0	0	3

8	BME462	Marine Propellers and Propulsion	3	0	0	3
9	BME463	Nanotechnology for Energy Systems	3	0	0	3
10	BME464	Waste to Energy Conversion	3	0	0	3
11	BME465	Cryogenic Engineering	3	0	0	3
12	BME466	Energy Conservation in Industries	3	0	0	3

STREAM D: ENGINEERING MATERIALS

Sl.no	Course Code	Course Title	Periods per week			Credits
			L	T	P	
1	BME371	Polymer Science And Engineering	3	0	0	3
2	BME372	Characterization of Materials	3	0	0	3
3	BME373	Powder Metallurgy	3	0	0	3
4	BME374	Composite Materials and Mechanics	3	0	0	3
5	BME375	Mechanical Metallurgy	3	0	0	3
6	BME471	Smart Materials: Application of Nanomaterial For Batteries, Solar And	3	0	0	3
7	BME472	Heat Treatment of Metals And Alloys	3	0	0	3
8	BME473	Creep And Fatigue Behavior of Materials	3	0	0	3
9	BME474	Fracture Mechanics and Failure Analysis	3	0	0	3

(iii) **Open Electives (OE)** comprising of Professional elective courses from respective Departments and provides the opportunity to a students to choose any course of any stream. A student should choose atleast 2 courses during the programme.

OPEN ELECTIVES				
Sl.No.	**Branch**	**Course Code**	**Course Name**	**Credits**
1.	Mech.	BME481	Applied Ergonomics	3
2.	Mech.	BME482	Structure and Properties of Materials	3
3.	Mech.	BME483	Total Quality Management	3
4.	Mech.	BME484	Supply Chain Management	3
5.	Mech.	BME385	Intellectual Property Rights	3
6.	Mech.	BME486	Entrepreneurial Development	3
7.	Mech.	BME487	Engineering Ethics & Sustainable Development	3
8.	Mech.	BME488	Engineering Innovation for SDG Impact	3