

BACHELOR OF TECHNOLOGY DEGREE PROGRAM IN MECHANICAL ENGINEERING B.TECH. (MECHANICAL ENGINEERING) 2018-2022

3.1 PROGRAM CURRICULUM

3.1.1 Mandatory Courses and Credits

The B.Tech (Mechanical Engineering) Program structure (2018-2022) consists of 61 Courses totalling 180 credits.

Table 3.1.1 summarizes the type of Courses, number of Courses under each type and the associated credits that are mandatorily required for the completion of the Degree.

TABLE 3.1.1			
B.Tech (Mechanical Engineering) 2018-2022: Mandatory Courses and Credits			
S. No	TYPE OF COURSES	NO. OF COURSES	CREDITS
1	Humanities, Social Sciences and Management Sciences(HS)	4	11
2	Basic Sciences (BS)	9	29
3	Engineering Sciences (ES)	7	21
4	Core (Professional) Course (CC)	28	76
5	Discipline(Professional) Elective (DE)	4	12
6	Open Elective (OE)	2	6
7	Professional Practice (PP)	2	20
8	Personal and Professional Skills (PPS)	4	4
9	University Learning Courses (ULC)	1	1
TOTAL		61	180
The mandatory minimum credits required for the award of the B.Tech (Mechanical Engineering) Degree is 180 Credits.			

The Table 3.1.1 is indicative of various components such as Foundation Courses (Basic Sciences, Engineering Sciences, Humanities, Social Sciences and Management Sciences), Professional Core, Discipline and Open Elective Courses. The unique feature of this Program is Professional Practice - I of 6-8 weeks during the end of 4th Semester and before the commencement of 5th Semester for the student to have industry exposure. The Professional Practice - II will be during their 7th / 8th Semester for about 15 weeks. University Learning Course, which is mandatory, is introduced in the curriculum for the student to give value of social service such as community service, clean and green, NSS, Protection of environment and health hazards, etc.

Table 3.1.1 lists the mandatory Courses, type of Courses, number of type of Courses and the associated credits required for the completion of the B.Tech (Mechanical Engineering) Program.

3.1.2 B.Tech (Mechanical Engineering) Program Year Wise Structure

First Year		Second Year		Third Year		Fourth Year	
Sem. 1	Sem. 2	Sem.3	Sem. 4	Sem. 5	Sem. 6	Sem. 7	Sem. 8
BS-3	BS-4	BS-1	BS-1	CC-7	CC-5	CC-3	DE-1
ES-4	ES-3	CC-6	CC-7	HS-1	HS-1	DE-1	OE-1
Summer Term		Summer Term/PP -I-1		Summer Term		Summer Term	
						DE-1	CC-3
						OE-1	DE-1

Mandatory Minimum Credits required for the award of the B.Tech (Mechanical Engineering) Degree: 180

Nomenclature:

- BS - Basic Sciences
- ES - Engineering Sciences
- HS – Humanities, Social Sciences and Management Sciences
- CC - Core Course
- DE - Discipline/Professional Electives
- OE - Open Electives
- PP-I/PP-II - Professional Practice
- PPS-Personal and Professional Skills
- ULC - University Learning Course

In the entire Program, the practical and skill based Course component contribute to an extent of approximately 30% out of the total credits of 180 for B.Tech (Mechanical Engineering) Program of four years duration.

3.2 PROGRAM STRUCTURE

I SEM - PHYSICS CYCLE (Aug-Dec)*							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MAT 101	Engineering Mathematics - I	3	1	0	4	4
2	PHY 101	Engineering Physics	4	0	0	4	4
3	EEE 101	Elements of Electrical Engineering	3	0	0	3	3
4	CIV 101	Elements of Civil Engineering	3	0	0	3	3
5	MEC 152	Engineering Graphics	2	0	4	4	6
6	ENG 103	Technical Written Communication	2	1	0	3	3
7	PHY 151	Engineering Physics Lab	0	0	2	1	2
8	MEC 151	Workshop Practice	0	0	2	1	2
9	PPS 105	Building Self Confidence	0	0	2	1	2
		TOTAL	17	2	10	24	29

I SEM - CHEMISTRY CYCLE (Aug-Dec)#							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MAT 101	Engineering Mathematics – I	3	1	0	4	4
2	CHE 101	Engineering Chemistry	4	0	0	4	4
3	ECE 101	Elements of Electronics Engineering	3	0	0	3	3
4	MEC 101	Elements of Mechanical Engineering	3	0	0	3	3
5	CIV 102	Environmental Science and Disaster Management	3	0	0	3	3
6	ENG 104	Technical Spoken Communication	1	0	2	2	3
7	CSE 151	Computer Programming	2	0	4	4	6
8	CHE 151	Engineering Chemistry Lab	0	0	2	1	2
9	PPS 105	Building Self Confidence	0	0	2	1	2
		TOTAL	19	1	10	25	30

II SEM - CHEMISTRY CYCLE (Jan-May)*							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MAT 102	Engineering Mathematics – II	3	1	0	4	4
2	CHE 101	Engineering Chemistry	4	0	0	4	4
3	ECE 101	Elements of Electronics Engineering	3	0	0	3	3
4	MEC 101	Elements of Mechanical Engineering	3	0	0	3	3
5	CIV 102	Environmental Science and Disaster Management	3	0	0	3	3
6	ENG 104	Technical Spoken Communication	1	0	2	2	3
7	CSE 151	Computer Programming	2	0	4	4	6
8	CHE 151	Engineering Chemistry Lab	0	0	2	1	2
9	PPS 106	Effective Communication	0	0	2	1	2
		TOTAL	19	1	10	25	30

II SEM - PHYSICS CYCLE (Jan-May)#							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MAT 102	Engineering Mathematics – II	3	1	0	4	4
2	PHY 101	Engineering Physics	4	0	0	4	4
3	EEE 101	Elements of Electrical Engineering	3	0	0	3	3
4	CIV 101	Elements of Civil Engineering	3	0	0	3	3
5	MEC 152	Engineering Graphics	2	0	4	4	6
6	ENG 103	Technical Written Communication	2	1	0	3	3
7	PHY 151	Engineering Physics Lab	0	0	2	1	2
8	MEC 151	Workshop Practice	0	0	2	1	2
9	PPS 106	Effective Communication	0	0	2	1	2
		TOTAL	17	2	10	24	29

Note: At the end of the 1st year (Common to all B.Tech programs) the total credits offered is 49.

The 1st year B.Tech Program structure is executed in two cycles.

* The students undergoing the “Physics” cycle shall take the Courses as indicated.

The students undergoing “Chemistry” cycle shall take the Courses as indicated.

III SEMESTER							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MAT 103	Engineering Mathematics - III	3	1	0	4	4
2	MEC 201	Basic Thermodynamics	3	1	0	4	4
3	MEC 206	Mechanics of Solids	3	1	0	4	4
4	MEC 203	Fluid Mechanics and Machines	3	1	0	4	4
5	MEC 205	Structure and Properties of Materials	3	0	0	3	3
6	MEC 253	Computer Aided Machine Drawing	0	0	2	1	2
7	MEC 251	Fluid Mechanics and Machines Lab	0	0	4	2	4
8	PPS 107	Design Thinking and Team Building	0	0	2	1	2
9	ULC 101	University Learning Course*				1	
		TOTAL	15	4	8	23/24	27

* Students have to register for the University Learning Course in any of the third, fourth or sixth semesters to earn the mandatory credits.

IV SEMESTER							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MAT 105	Numerical Methods	3	1	0	4	4
2	MEC 204	Production Techniques - I	3	0	0	3	3
3	MEC 202	Kinematics of Machines	3	1	0	4	4
4	MEC 211	Metrology and Mechanical Measurements	3	1	0	4	4
5	MEC 208	Applied Thermodynamics	3	1	0	4	4
6	MEC 254	Metallography and Materials Testing Lab	0	0	2	1	2
7	MEC 252	Machine Shop Practice	0	0	4	2	4
8	MEC 255	Metrology and Measurement Lab	0	0	2	1	2
9	PPS 108	Being Corporate Ready	0	0	2	1	2
10	ULC 101	University Learning Course*				1	
		TOTAL	15	4	10	24/25	29

** NOTE: Students will undergo Professional Practice - I during the summer break between the fourth and fifth semesters and the credits earned will be accounted for in the fifth semester.

V SEMESTER							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MEC 214	Dynamics of Machines	3	1	0	4	4
2	MEC 210	Design of Machine Elements - I	3	1	0	4	4
3	MEC 207	Production Techniques - II	3	0	0	3	3
4	MGT 112 / MGT 113	Engineering Economics/ Digital Entrepreneurship	3	0	0	3	3
5	MEC 217	Finite Element Analysis	3	0	0	3	3
6	MEC 3XX	Discipline Elective - I	3	0	0	3	3
7	MEC 257	Foundry, Forging and Welding Lab	0	0	2	1	2
8	MEC 258	Energy Conversion Engineering Lab	0	0	2	1	2
9	PIP 101	Professional Practice - I**				5	
		TOTAL	18	2	4	27	24

VI SEMESTER							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MEC 215	Heat and Mass Transfer	3	1	0	4	4
2	MEC 212	Mechanical Vibrations	3	1	0	4	4
3	MEC 216	Design of Machine Elements - II	3	1	0	4	4
4	MGT 113 / MGT 112	Digital Entrepreneurship/ Engineering Economics	3	0	0	3	3
5	MEC 3XX	Discipline Elective - II	3	0	0	3	3
6	MEC 260	Heat and Mass Transfer Lab	0	0	2	1	2
7	MEC 259	Mechanisms, Machines and Design Lab	0	0	2	1	2
8	ULC 101	University Learning Course*				1	
		TOTAL	15	3	4	20/21	22

VII SEMESTER							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MEC 213	I. C. Engine and Fuels	3	1	0	4	4
2	MEC 209	Mechatronics	3	1	0	4	4
3	MEC 3XX	Discipline Elective - III	3	0	0	3	3
4	MEC 4XX	Open Elective - I	3	0	0	3	3
5	MEC 256	Mechatronics Lab	0	0	2	1	2
		TOTAL	12	2	2	15	16

VIII SEMESTER							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MEC 3XX	Discipline Elective - IV	3	0	0	3	3
2	MEC 4XX	Open Elective - II	3	0	0	3	3
3	PIP 102	Professional Practice - II				15	
		TOTAL	6	0	0	21	6

TABLE — 3.2.1							
DISCIPLINE ELECTIVES							
S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MEC 301	Power Plant Engineering	3	0	0	3	3
2	MEC 302	Computer Integrated Manufacturing	3	0	0	3	3
3	MEC 303	Turbomachinery	3	0	0	3	3
4	MEC 304	Production Planning and Control	3	0	0	3	3
5	MEC 305	Product Design and Development	3	0	0	3	3
6	MEC 306	Refrigeration and Air conditioning	3	0	0	3	3

7	MEC 307	Computational Fluid Dynamics	3	0	0	3	3
8	MEC 308	Compressible Fluid Flow	3	0	0	3	3
9	MEC 310	Flexible Manufacturing Systems	3	0	0	3	3
10	MEC 311	Industrial Engineering Techniques	3	0	0	3	3
11	MEC 312	Fundamental of Aerospace Engineering	3	0	0	3	3
12	MEC 313	Robotics	3	0	0	3	3
13	MEC 314	Smart Manufacturing	3	0	0	3	3
14	MEC 315	Tribology and Bearing Design	3	0	0	3	3
15	MEC 316	Mechanics of Composite Materials	3	0	0	3	3
16	MEC 317	Experimental Stress Analysis	3	0	0	3	3
17	MEC 318	Fracture Mechanics	3	0	0	3	3
18	MEC 319	Hydraulics and Pneumatics	3	0	0	3	3
19	MEC 320	Machine Tool Design	3	0	0	3	3
20	MEC 321	Theory of Elasticity	3	0	0	3	3
21	MEC 322	Theory of Plasticity	3	0	0	3	3
22	MEC 323	Non-Destructive Testing	3	0	0	3	3
23	MEC 324	Control Engineering	3	0	0	3	3
24	MEC 325	Engineering Dynamics	3	0	0	3	3
25	MEC 326	Smart Materials	3	0	0	3	3
26	MEC 327	Advanced Heat Transfer	3	0	0	3	3

TABLE — 3.2.2

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF CIVIL ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	CIV 401	Geographical Information Systems	3	0	0	3	3
2	CIV 402	Environmental Impact Assessment	3	0	0	3	3
3	CIV 403	Sustainable Materials and Green Buildings	3	0	0	3	3
4	CIV 404	Construction Project Management	3	0	0	3	3

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	CSE 401	Image Processing	3	0	0	3	3
2	CSE 402	Data Structures Using C	3	0	0	3	3
3	CSE 403	Software Testing and Quality Assurance	3	0	0	3	3
4	CSE 404	Social Network Analytics	3	0	0	3	3
5	CSE 405	Digital and Mobile Forensics	3	0	0	3	3
6	CSE 406	Database Management Systems	3	0	0	3	3
7	CSE 407	Multimedia and Animation	3	0	0	3	3

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	EEE 401	Artificial Neural Networks	3	0	0	3	3
2	EEE 405	Energy Audit	3	0	0	3	3
3	EEE 406	Research Methodology	3	0	0	3	3
4	EEE 407	Smart Grid Technology	3	0	0	3	3
5	EEE 408	Professional Ethics in Engineering	3	0	0	3	3

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	ECE 401	Artificial Neural Networks	3	0	0	3	3
2	ECE 402	Biomedical Instrumentation	3	0	0	3	3
3	ECE 407	IOT: Internet of Things	3	0	0	3	3
4	ECE 408	Industrial Automation and Control	3	0	0	3	3

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF MECHANICAL ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	MEC 401	Automotive Vehicles	3	0	0	3	3
2	MEC 402	Nanotechnology	3	0	0	3	3
3	MEC 405	Engineering Optimisation	3	0	0	3	3
4	MEC 406	Operations Research for Engineers	3	0	0	3	3
5	MEC 407	Operations Management	3	0	0	3	3
6	MEC 408	Work Study	3	0	0	3	3
7	MEC 409	Project Management	3	0	0	3	3
8	MEC 410	Organizational Behaviour	3	0	0	3	3
9	MEC 411	Renewable Energy Systems	3	0	0	3	3

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF PETROLEUM ENGINEERING

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	PET 402	Computational Methods in Chemical Engineering	3	0	0	3	3
2	PET 403	Computational Fluid Dynamics	3	0	0	3	3
3	PET 405	Petroleum Corrosion Technology	3	0	0	3	3
4	PET 406	Polymer Technology	3	0	0	3	3
5	PET 407	Total Quality Management	3	0	0	3	3
6	PET 408	Oil and Gas Marketing and Resource Management	3	0	0	3	3

OPEN ELECTIVES OFFERED BY THE DEPARTMENT OF BASIC SCIENCES AND HUMANITIES

S. NO.	COURSE CODE	COURSE NAME	CREDIT STRUCTURE				CONTACT HOURS
			L	T	P	CREDITS	
1	PSY 401	Social Psychology	3	0	0	3	3
2	ENG 401	Literature Appreciation	3	0	0	3	3

3	CHE 401	Composite Materials	3	0	0	3	3
4	CHE 402	Catalysis Technology	3	0	0	3	3