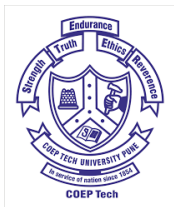# COEP Technological University Pune
(A Unitary Public University of Govt. of Maharashtra)

School of Mechanical Engineering
Curriculum Structure

B. Tech
Mechanical Engineering

(Effective from: A.Y. 2023-24)

List of Abbreviations

Abbreviation	Title
PCC	Programme Core Course (PCC)
BSC	Basic Science Course
ESC	Engineering Science Course
PEC	Programme Elective Course (PEC)
VSEC	Vocational and Skill Enhancement Course (VSEC)
HSMC	Humanities Social Science and Management
IKS	Indian Knowledge System (IKS)
VEC	Value Education Course (VEC)
RM	Research Methodology (RM)
--	Internship
--	Project
CEA	Community Engagement Activity (CEA)/Field Project
CCA	Co-curricular & Extracurricular Activities (CCA)
OE/SE	Open/School Elective (OE/SE) other than program
MD M	Multidisciplinary Minor (MD M)
AEC	Ability Enhancement course
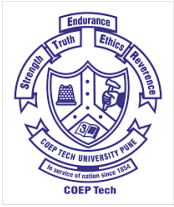
Vision of the Department:

To be a leader amongst engineering institutions in India, offering value-based world class education and constantly pursuing excellence

Mission of the Department:

M1: To offer state-of-the-art undergraduate, postgraduate, and doctoral programs.

M2: To develop employable and skilled undergraduates to accept the global and societal challenges, while imparting quality education at postgraduate and research level.

M3: To Foster the passion of life-long learning in all facets of employability.

Program Educational Objectives (PEOs)

Cater to the needs of Indian as well as multinational industries. Be competent with a strong technological background to analyze data, formulate and undertake industrial problems and obtain viable solutions. Make successful career in industry / research / higher Studies. Be life-long learning and should be able to work on multi-disciplinary projects. Be Competent for effective communication, in management and in professional skills and ethics.

Program Outcomes

Program Outcomes of Engineering program as per norms (common to all UG/ PG Programme)

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, research literature, and analyses complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. 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 public health and safety, and cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems:
The problems:
• that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline.
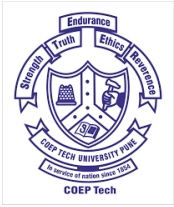
COEP TECHNOLOGICAL UNIVERSITY, PUNE
A Unitary Public University of Government of Maharashtra
(Formerly College of Engineering Pune)
School of Mechanical and Materials Engineering
Wellesley Road, Shivajinagar, Pune - 411005

• that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions.
• that require consideration of appropriate constraints/requirements not explicitly given in the problem statement. (like cost, power requirement, durability, product life, etc.).
• which needs to be defined (modeled) within appropriate mathematical framework.
• that often require use of modern computational concepts and tools.

PO5. 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.

PO6. The engineer and society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to professional engineering practice.

PO7. Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO9. Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with the 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.

PO11. 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.

PO12. 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 Objectives (PSOs)

PSO1. Design and Development: The ability to design and develop the products as per the need of the customers in the field of Mechanical and Allied Engineering Industries.
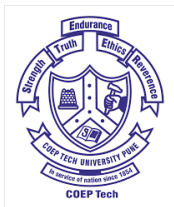
PSO2. Engineering Analysis and optimization: The ability to analyze and optimize the Mechanical systems/processes using various computational tools.

PSO3. Society: To strengthen Mechanical Engineering graduates who would value professional and ethical responsibilities while solving societal problems.

Course Group	Credits	%	Course type		Sem1	Sem2	Sem3	Sem4	Sem5	Sem6	Sem7	Sem8	Total	% Credits
BSC/ESE	32	20	Basic Science Course	BSC	6	8							14	8.75
			Engineering Science Course	ESC	10	8							18	11.25
Program courses	72	45	Programme Core Course	PCC			11	11	11	12	8		53	33.13
			Programme Elective Course	PEC					3	4	6	6	19	11.88
Multidisciplinary Courses	20	12.5	Multidisciplinary Minor	MD M				3	4	4	3		14	8.75
			Open Elective Other than a particular Program	OE/SE			2	2	2				6	3.75
Skill Courses	6	3.75	Vocational and Skill Courses	VSEC	1	1		2		2			6	3.75
Humanities Social Science and Managem	12	7.5	Ability Enhancement Course	AEC	2		2						4	2.5

Category			Course	Abbr									Total	%
ent (HSSM)			Entrepreneurship / Economics /Management Courses	HSSM/ HSMC			2	2					4	2.5
			Indian Knowledge System	IKS		2							2	1.25
			Value Education Course	VEC			1	1					2	1.25
Experimental Learning Courses	16	10	Research Methodology	RM							2		2	1.25
			Comm. Eng. Project/ Field Project	CEA			2						2	1.25
			Internship / OJT	INTERNSHIP					3		3		6	3.75
			Project	PROJECT								6	6	3.75
Liberal Learning Courses	2	1.25	Co-curricular Course	CCA	1	1							2	1.25
	160	100			20	20	20	21	23	22	22	12	160	100
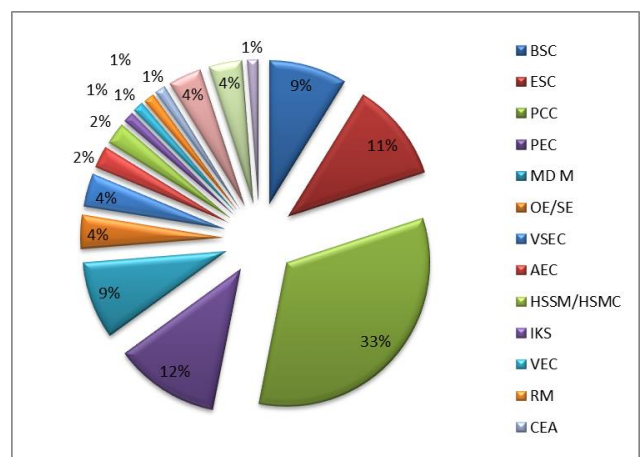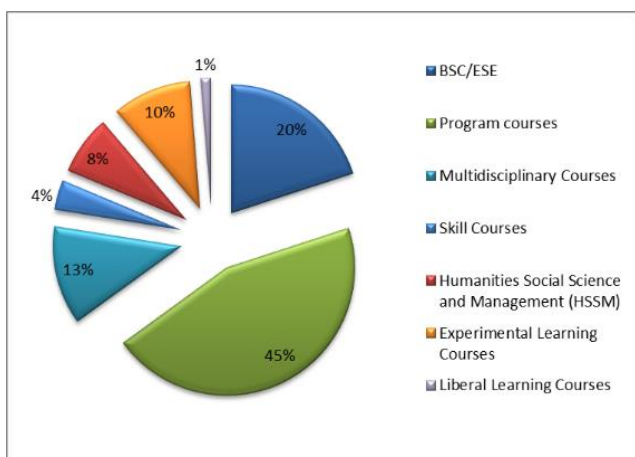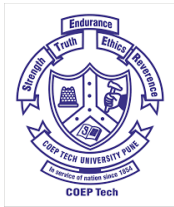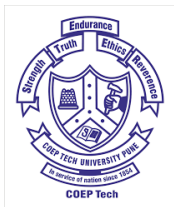
F. Y. B. Tech
Mechanical Engineering
[Level 4.5, UG Certificate] Semester -I

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	BSC	<tbd>	Matrix Algebra, calculus and Probability	2	1	0	1	3	30	10	60	--	--
02	BSC	<tbd>	Engineering Physics	2	0	2	1	3	30	20	50	CIE: 100	
03	ESC	<tbd>	Basics of Electrical and Electronics Engineering	2	0	2	1	3	30	20	50	CIE: 100	
04	ESC	<tbd>	Engineering Drawing and Graphics	1	0	4	1	3	CIE: 100			CIE: 100	
05	ESC	<tbd>	Engineering Mechanics	3	0	2	1	4	30	10	60	CIE: 100	
06	AEC-I	<tbd>	Communication Skills	1	0	2	0	2	CIE: 100			CIE: 100	
07	CCA	<tbd>	Liberal Learning Course	0	0	2	2	1	--	--	--	CIE: 100	
08	VSEC-I	<tbd>	Manufacturing Practices and Fab. Lab - I	0	0	2	1	1	---			CIE: 100	
			Total	**11**	**1**	**16**	**8**	**20**					

[Level 4.5, UG Certificate] Semester -II

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	BSC	<tbd>	Engineering Chemistry	2	0	2#	1	3	30	20	50	CIE: 100	
02	BSC	<tbd>	Ordinary Differential Equations and Multivariate Calculus	2	1	0	1	3	30	10	60	--	--
03	BSC	<tbd>	Biology for Engineers	2	0	0	1	2	30	20	50	--	--

04	ESC	*<tbd>*	Systems in Mechanical Engg.	2	0	2	1	3	30	20	50	CIE: 100	
05	ESC	*<tbd>*	Design Thinking and Idea Lab	0	0	2	1	1	--	--	--	CIE: 100	
06	ESC	*<tbd>*	Programming for Problem Solving	1	0	2	2	2	CIE: 100			CIE: 100	
07	ESC	*<tbd>*	Materials Science	2	0	0	1	2	30	20	50	--	--
08	VSEC-II	*<tbd>*	Manufacturing Practices & Fab. Lab - II	0	0	2	0	1	--	--	--	CIE: 100	
09	IKS	*<tbd>*	Indian Knowledge System	2	0	0	1	2	CIE: 100			--	--
10	CCA	*<tbd>*	Co-curricular and Extracurricular Activity (Office Automation)	0	0	2	0	1	--	--	--	CIE: 100	
			Total	**13**	**1**	**12**	**9**	**20**					

\# combined lab for Applied Chemistry and Material science
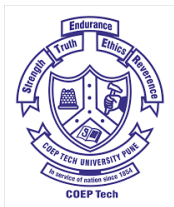
Legends: **L**-Lecture, **T**-Tutorial, **P**-Practical, **S**-Self Study, **Cr**-Credits
  ISE-In-Semester-Evaluation, ESE-End-Semester-Evaluation, MSE-Mid-Semester-Evaluation,
  TA-Teachers' Assessment, CIE-Continuous-Internal-Evaluation

Exit option to qualify for Diploma: Any Three Skill based Courses:

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	VSEC	*<tbd>*	Computer Aided Geometric Modeling	0	0	4	1	2	---			CIE: 100	
02	VSEC	*<tbd>*	Basics of CNC Programming	0	0	4	1	2	---			CIE: 100	
03	VSEC	*<tbd>*	Additive Manufacturing	0	0	4	1	2	---			CIE: 100	
04	VSEC	*<tbd>*	Metallurgical Lab Practice - I	0	0	4	1	2	---			CIE: 100	
05	VSEC	*<tbd>*	Basics of Robotics and AI	0	0	4	1	2	---			CIE: 100	

COEP TECHNOLOGICAL UNIVERSITY, PUNE
A Unitary Public University of Government of Maharashtra
(Formerly College of Engineering Pune)
School of Mechanical and Materials Engineering
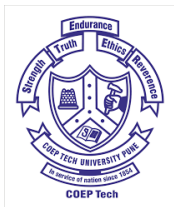Wellesley Road, Shivajinagar, Pune - 411005

S. Y. B. Tech
Mechanical Engineering
[Level 5, UG Regular] Semester -III

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Theory MSE	Theory TA	Theory ESE	Laboratory ISE	Laboratory ESE
01	PCC	<tbd>	Engineering Thermodynamics	3	1	0	0	4	30	10	60	--	--
02	PCC	<tbd>	Solid Mechanics	2	0	0	1	2	30	10	60	--	
03	PCC	<tbd>	Machine Drawing & Geometric Modeling	1	0	2	1	2	30	10	60	50	50
04	PCC	<tbd>	Manufacturing Technology	2	0	2	1	3	30	20	50	CIE: 100	
05	OE	<tbd>	Open Elective – I	1	0	2	0	2	CIE:100			50	50
06	AEC-II	<tbd>	Indian Language: Sanskri/Pali	2	0	0	0	2	30	20	50	--	
07	VEC-I	<tbd>	Constitution of India and Universal Human Values	1	0	0	0	1	CIE: 100			--	
08	HSSM	<tbd>	Principle of Entrepreneurship	2	0	0	2	2	30	20	50	--	
09	CEA	<tbd>	Community Engagement Activity /Field Project *	0	0	4	0	2	CIE: 100			--	--
			Total	15	1	10	5	20					

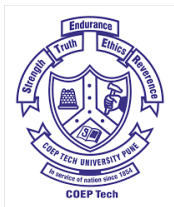*****After SEM II during summer vacation and evaluation will be done in the start of SEM III.

[Level 5, UG Regular] Semester -IV

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	PCC	<tbd>	Fluid Mechanics	3	0	2	1	4	30	10	60	CIE: 100	
02	PCC	<tbd>	Design of Machine Elements	2	1	0	1	3	30	10	60	--	--
03	PCC	<tbd>	Kinematics of Machines	3	0	2	1	4	30	10	60	CIE: 100	
04	OE	<tbd>	Open Elective - II	2	0	0	0	2	30	10	60	--	
05	MDM-I	<tbd>	Multidisciplinary Minor 2	3	0	0	1	3	30	10	60	--	
06	VSEC	<tbd>	Numerical Methods and Programming Language	1	0	2	1	2	CIE:100			50	50
07	HSMC	<tbd>	Principle of Economics	2	0	0	1	2	30	20	50	--	--
08	VEC-II	<tbd>	Environmental Studies	1	0	0	1	1	CIE: 100			--	--
Total				**17**	**1**	**6**	**7**	**21**					

S. Y. B. Tech.
Mechanical Engineering
[Level 5, UG Diploma] Semester -III

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	PCC	*<tbd>*	Engineering Thermodynamics	3	1	0	0	4	30	10	60	--	--
02	PCC	*<tbd>*	Solid Mechanics	2	0	0	1	2	30	20	50	--	--
03	PCC	*<tbd>*	Machine Drawing & Geometric Modeling	1	0	2	1	2	CIE:100			50	50
04	PCC	*<tbd>*	Manufacturing Technology	2	0	2	1	3	30	20	50	CIE: 100	
05	OE	*<tbd>*	Open Elective – I	1	0	2	0	2	CIE:100			CIE:100	
06	AEC-II	*<tbd>*	Indian language Sanskrit\Pali	2	0	0	0	2	30	20	50	--	
07	VEC-I	*<tbd>*	Constitution of India and Universal Human Value	1	0	0	0	1	CIE: 100			--	
08	BSC	*<tbd>*	Mathematics	3	0	0	1	3	30	10	60	--	--
09	HSMC	*<tbd>*	Principle of Entreprenership	2	0	0	1	2	30	20	50	--	
			Total	**20**	**1**	**6**	**6**	**21**					

[Level 5, UG Diploma] Semester –IV

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
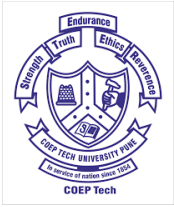
01	PCC	*<tbd>*	Fluid Mechanics	3	0	2	1	4	30	10	60	50	50
02	PCC	*<tbd>*	Design of Machine Elements	2	1	0	1	3	30	20	50	--	--
03	PCC	*<tbd>*	Kinematics of Machines	3	0	2	1	3	30	20	50	50	50
04	PCC	*<tbd>*	Entrepreneurship	2	0	0	2	1	30	20	50	--	--
05	OE	*<tbd>*	Open Elective - II	2	0	0	1	2	30	20	50	--	--
06	MDM-I	*<tbd>*	Multidisciplinary Minor-I	3	0	0	1	3	30	20	50	--	--
07	VSEC	*<tbd>*	Numerical Methods and Programming Language	1	0	2	1	2	CIE:100			50	50
08	HSMC	*<tbd>*	Principle of Economics	2	0	0	1	2	30	20	50	--	--
09	VEC-II	*<tbd>*	Environmental Studies	1	0	0	1	1	CIE: 100			--	
10	HSMC	*<tbd>*	Communication Skills	1	0	2	0	2	CIE: 100			CIE: 100	
Total				**17**	**1**	**6**	**18**	**23**					

Legends: **L**-Lecture, **T**-Tutorial, **P**-Practical, **S**-Self Study, **Cr**-Credits
ISE-In-Semester-Evaluation, **ESE**-End-Semester-Evaluation, **MSE**-Mid-Semester-Evaluation, **TA**-Teachers' Assessment, **CIE**-Continuous-Internal-Evaluation

Exit option to qualify for UG Diploma:

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	PCC	*<tbd>*	Computer Aided Manufacturing (CAM)	0	0	4	0	4	------			CIE: 100	
02	PCC	*<tbd>*	Mini Project	0	0	8	0	4	------			CIE: 100	

A Unitary Public University of Government of Maharashtra

(Formerly College of Engineering Pune)

School of Mechanical and Materials Engineering

Wellesley Road, Shivajinagar, Pune - 411005

T. Y. B. Tech
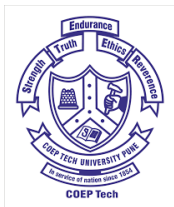## Mechanical Engineering
[Level 5.5, UG] Semester -V

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	PCC	<tbd>	Heat Transfer	3	0	2	1	4	30	10	60	CIE:100	
02	PCC	<tbd>	Dynamics of Machine	3	0	2	0	4	30	20	50	CIE:100	
03	PCC	<tbd>	Metrology& Measurement	2	0	2	1	3	30	20	50	CIE:100	
04	PEC	<tbd>	Program Elective Course -I (Specify List) *	2	0	2	1	3	30	20	50	--	--
05	MDM	<tbd>	Multidisciplinary Minor III	4	0	0	0	4	30	20	50	--	--
06	OE	<tbd>	Open Elective Course 3	2	0	0	1	2	30	20	50	--	--
07	ELC	<tbd>	Internship 1#	0	0	6	0	3	CIE:100			50	50
			Total	**15**	**0**	**14**	**4**	**23**					

The evaluation scheme columns are headed: **Evaluation Scheme (Weightage in %)**

Summer Internship (Industry /R&D / Academic Institute) after IV semester during summer vacation and evaluation will be done at the start of V semester.

*Program Elective Course I – Discipline-wise List		
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**
Finite Element Methods (FEM)	Fluid Dynamics	Advanced Manufacturing Technology
Experimental Stress Analysis	Internal Combustion Engines	Industrial Engineering & Operation Research

[Level 5.5, UG] Semester -VI

Sr. No.			Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)

	Course Type	Course Code							Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	PCC	<tbd>	Mechanical System Design	3	0	2	1	4	30	10	60	CIE:100	
02	PCC	<tbd>	Computer Aided Design and Manufacturing	3	0	2	1	4	30	20	50	CIE:100	
03	PCC	<tbd>	Fluid Machinery	3	0	2	0	4	30	20	50	CIE:100	
04	PEC	<tbd>	Program Elective Course -II (Specify List) *	3	0	2	0	4	30	20	50	--	--
05	MDM	<tbd>	Multidisciplinary Minor IV	4	0	0	1	4	30	20	50	--	--
06	VSEC	<tbd>	Mini project	0	0	4	2	2	CIE:100			CIE:100	
			Total	**15**	**0**	**12**	**5**	**22**					

Exit Option to B VOC:

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	PCC	VSEC	Finite Element Analysis	3	0	2	1	4	30	10	60	CIE:100	
02	PCC	VSEC	Generative design	3	0	2	1	4	30	20	50	CIE:100	

*Program Elective Course II – Discipline-wise List			
Design Engineering	Thermal Engineering/Fluid Science	Manufacturing Science and Engineering	Other Disciplines
Advanced Finite Element Methods (FEM)	Principle Of Hydraulic Machines and System Design	Micro & Nano Machining	Head form Engineering
Tribology	Computational Fluid Dynamics	Additive Manufacturing	Automotive Technology
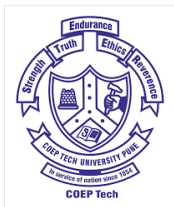
Piping Design	Heat Exchangers: Fundamentals and Design Analysis	Tool and Die Design	Railway Engineering

B. Tech
Mechanical Engineering
[Level 6, UG] Semester -VII

Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Theory MSE	Theory TA	Theory ESE	Laboratory ISE	Laboratory ESE
01	PCC	*<tbd>*	Energy Conversion	2	0	0	1	2	30	10	60	50	50
02	PCC	*<tbd>*	Refrigeration and Air conditioning	2	0	2*	1	3	30	20	50	CIE: 100	
03	PCC	*<tbd>*	Vibration and Acoustics	2	0	2	1	3	30	20	50	--	--
04	PEC	*<tbd>*	Program Elective Course -III (Specify List) *	3	0	0	0	3	30	20	50	--	--
05	PEC	*<tbd>*	Program Elective Course -IV (Specify List) **	3	0	0	0	3	30	20	50	--	--
06	ELC	*<tbd>*	Internship 2 #	0	0	6		3	CIE: 100			CIE: 100	
07	RM	*<tbd>*	Research Methodology and IPR	2	0	0	2	2	30	20	50	CIE: 100	
08	MDM	*<tbd>*	Multidisciplinary Minor V	3	0	0	1	3	30	20	50	--	--
			Total	**15**	**0**	**10**	**6**	**22**					

Summer Internship (Industry /R&D / Academic Institute) after VI semester during summer vacation and evaluation will be done at the start of VII semester.

*Program Elective Course III – Discipline-wise List			
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**	**Other Disciplines**

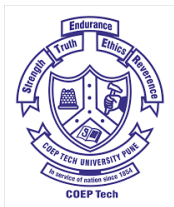|			
CAD/CAM Customization	Advanced Computational Fluid Dynamics	Advanced Joining Techniques	Hybrid and Electric Vehicles
Mechanics of Composite Materials	Design of Thermal Systems	Reverse Engineering	Design of Defense Equipment
Steel Structure Design	Turbo machinery	Production and Operations Management	Aerospace Engineering

**Program Elective Course IV – Discipline-wise List			
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**	**Other Disciplines**
Design Optimization	Renewable Energy Resources	Metal forming Technology	Biomedical Engineering
Product design and development	Solar Energy Engineering and Systems	Industrial Safety Engineering	Condition Monitoring
Vehicle Dynamics	Biomechanics	Plastic & Rubber Technology	Industry 4.0

[Level 6, UG] Semester -VIII

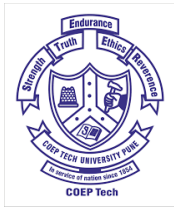| Sr. No.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
01	PEC	<tbd>	Program Specific Elective- V (Specify List) *	3	0	0	3	3	30	10	60	50	50
02	PEC	<tbd>	Program Specific Elective- VI (Specify List) **	3	0	0	3	3	30	20	50	--	--
03	ELC	<tbd>	Internship based Project / On Campus Project #	0	0	12	6	12	CIE:100			CIE:100	
			Total	**6**	**0**	**12**	**12**	**12**					

Project based learning should be completed in VIII semester.

*Program Elective Course V – Discipline-wise List			
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**	**Other Disciplines**
Farm Machinery Design	Air Conditioning System Design	AI for Manufacturing	Dental Engineering
Design for Fatigue and Fracture	Power Plant Engineering	Enterprise Resource Planning (ERP)	Machine Learning for Mechanical Engineering
Mechatronics	Thermal Design and Management of Systems	Advanced Foundry and Forging technology	Sustainable and Green Energy

**Program Elective Course VI – Discipline-wise List			
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**	**Other Disciplines**
Fundamentals Of Food Process Design	Microfluidics And Nano-fluids	Advanced Framework Design	Sugar Technology
Automatic Control System	Fundamentals of Nuclear Power Generation	Product Lifecycle Management (PLM)	Robotics & AI
Material Handling System Design	Marine Engineering	Reliability Engineering	Dairy Plant Engineering

Multidisciplinary Minors- Mechanical Engineering

Sem.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
IV		MDM I	Agriculture Fundamentals	3	0	0	1	3	30	10	60		
V		MDM II	Biomass Processing Technologies	3	1	0	1	4	30	20	50	CIE:100	
VI		MDM III	Farm machinery and Food processing	3	1	0	0	4	30	20	50	CIE:100	

VII		MDM IV	Advances in agriculture and smart farming	3	0	0	1	3	30	10	60		
Total				**12**	**2**	**0**	**3**	**14**			**-**		

Double Minors and Honors (Additional 20 Credits)
Double minors – Mechanical Engineering for other Branches

Sem.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
III		*<tbd>*	Automotive Technology	2	-	-	2	2	30	10	60	50	50
IV		*<tbd>*	Design of Machine Elements	3	-	-	3	3	30	20	50	--	--
V		*<tbd>*	Renewable Energy	3	-	-	3	3	30	20	50	50	50
VI		*<tbd>*	Heat Transfer	3	-	-	3	3					
VII		*<tbd>*	Finite Element Methods	3	-	-	3	3					
Total				**14**	**-**	**-**	**14**	**14**			**-**		

Honors- Mechanical Engineering - Design Engineering

Sem.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
III		*<tbd>*	Hydraulic And Pneumatic System	3	1	-	3	4	30	10	60	CIE:100	
IV		*<tbd>*	Fracture Mechanics	3	1	-	3	4	30	20	50	CIE:100	
V		*<tbd>*	Advanced Vibration and Acoustics	3	1	-	3	4	30	20	50	CIE:100	
VI		*<tbd>*	Optimization Techniques in Design	3	1	-	3	4	30	20	50	CIE:100	

VII		<tbd>	Mathematical Methods in Engineering	3	1	-	3	4	30	20	50	CIE:100
Total				**15**	**5**	**-**	**15**	**20**				

Honors- Mechanical Engineering - Thermal Engineering

Sem.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
III		<tbd>	Fluid Dynamics	3	1	-	3	4	30	10	60		
IV		<tbd>	Computational Fluid Dynamics	3	1	-	3	4	30	20	50		
V		<tbd>	Advanced Heat Transfer	3	1	-	3	4	30	20	50		
VI		<tbd>	Design of Thermal Systems	3	1	-	3	4					
VII		<tbd>	Mathematical Methods in Engineering	3	1	-	3	4					
Total				**15**	**5**	**-**	**15**	**20**			**-**		

Note: The Courses selected for Honors degree from the pool of electives by a particular student should not be part of Mandatory 160 regular credits.

Honors- Mechanical Engineering - Research

Sem.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Evaluation Scheme (Weightage in %)				
									Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
III		<tbd>	Problem Identification and Definition	3	1	-	3	4	30	10	60		
IV		<tbd>	Literature Review	3	1	-	3	4	30	20	50		
V		<tbd>	Experimental Work/Analytical Tools and	3	1	-	3	4	30	20	50		

			Prototype Development										
VI		*<tbd>*	Data Analysis	3	1	-	3	4					
VII		*<tbd>*	Publication	3	1	-	3	4					
Total				**15**	**5**	**-**	**15**	**20**			**-**		

B. Tech Honors with Research and Multidisciplinary Minor

Sem.	Course Type	Course Code	Course Name	L	T	P	S	Cr	Theory			Laboratory	
									MSE	TA	ESE	ISE	ESE
VI		*<tbd>*	Research Project (Part 1) Problem Identification and Definition, Literature Review, experimental Work					10					
VII		*<tbd>*	Research Project (Part 2) Prototype Development, Data Analysis, Publication					10					
Total								**20**			**-**		

Honors- Mechanical Engineering

For Honors in Mechanical Engineering, students should select below courses of 20 credits from the pool of electives given below. These selected courses should not be part of the mandatory 160 regular credits.

| *Program Elective Course I – Discipline-wise List		
Design Engineering	Thermal Engineering/Fluid Science	Manufacturing Science and Engineering
Finite Element Methods (FEM)	Fluid Dynamics	Advanced Manufacturing Technology

Experimental Stress Analysis	Internal Combustion Engines	Industrial Engineering & Operation Research

*Program Elective Course II – Discipline-wise List		
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**
Advanced Finite Element Methods (FEM)	Principle Of Hydraulic Machines and System Design	Micro & Nano-Machining
Tribology	Computational Fluid Dynamics	Additive Manufacturing
Piping Design	Heat Exchangers: Fundamentals and Design Analysis	Tool and Die Design

*Program Elective Course III – Discipline-wise List			
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**	
CAD/CAM Customization	Advanced Computational Fluid Dynamics	Advanced Joining Techniques	
Mechanics of Composite Materials	Design of Thermal Systems	Reverse Engineering	
Steel Structure Design	Turbo machinery	Production and Operations Management	

**Program Elective Course IV – Discipline-wise List			
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**	
Design Optimization	Renewable Energy Resources	Metal forming Technology	
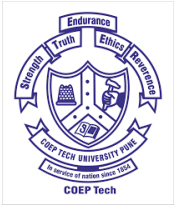
Product design and development	Solar Energy Engineering and Systems	Industrial Safety Engineering	
Vehicle Dynamics	Biomechanics	Plastic & Rubber Technology	

*Program Elective Course V – Discipline-wise List			
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**	
Farm Machinery Design	Air Conditioning System Design	AI for Manufacturing	
Design for Fatigue and Fracture	Power Plant Engineering	Enterprise Resource Planning (ERP)	
Mechatronics	Thermal Design and Management of Systems	Advanced Foundry and Forging technology	

**Program Elective Course VI – Discipline-wise List			
Design Engineering	**Thermal Engineering/Fluid Science**	**Manufacturing Science and Engineering**	
Fundamentals Of Food Process Design	Microfluidics And Nano-fluids	Advanced Framework Design	
Automatic Control System	Fundamentals of Nuclear Power Generation	Product Lifecycle Management (PLM)	
Material Handling System Design	Marine Engineering	Reliability Engineering	