

M.Tech Program from Department of Mechanical Engineering
M. Tech. in Mechanical Design

Program Learning Objectives:	Program Learning Outcomes:
<p>Program Goal 1: The graduates will acquire contemporary knowledge and concepts of mechanical equipment design.</p>	<p>Program Learning Outcome 1a: Understanding of conventional and advanced stress analysis.</p> <p>Program Learning Outcome 1b: Analytical ability to critically evaluate the design performance of various basic and advanced mechanical equipment designs.</p>
<p>Program Goal 2: The graduates will possess the concepts of materials deformation and their mechanisms.</p>	<p>Program Learning Outcome 2a: Understanding the dynamics of mechanical components.</p> <p>Program Learning Outcome 2b: Identify and critically evaluate the dynamic performance of mechanical equipment.</p>
<p>Program Goal 3: The graduates will possess state-of-art in the knowledge of advanced materials failure and failure theories.</p>	<p>Program Learning Outcome 3: Ability to analyse the cause and prevention of failure in mechanical components</p>
<p>Program Goal 4: The graduates will possess the state-of-the-art practical and numerical approach for the analysis of mechanical design.</p>	<p>Program Learning Outcome 4a: Acquire the appropriate engineering skill and knowledge pertaining to design processes.</p> <p>Program Learning Outcome 4b: Possess the computational and analytical expertise required for the analysis of mechanical equipment design.</p>

Sl. No.	Subject Code	SEMESTER I	L	T	P	C
1.	HS5111	Technical Writing and Soft Skill	1	2	2	4
2.	ME5101	Advanced Engineering Mathematics	3	1	0	4
3.	ME5102	Theory of Elasticity	3	0	0	3
4.	ME5103	Finite Element Analysis	3	0	0	3
5.	ME5104	Design Lab - I	0	0	3	1.5
6.	ME61XX	DE-I	3	0	0	3
7.	ME61XX	DE-II	3	0	0	3
8.	XX61PQ	IDE	3	0	0	3
		TOTAL	19	3	5	24.5

IDE (Inter Disciplinary electives) in the curriculum aims to create multitasking professionals/scientists with learning opportunities for students across disciplines/aptitude of their choice by opting level (5 or 6) electives, as appropriate, listed in the approved curriculum.

Sl. No.	Subject Code	SEMESTER II	L	T	P	C
1.	ME5201	Advanced Engineering Software Lab	1	0	4	3
2.	ME5202	Advanced Dynamics & Vibration	3	1	0	4
3.	ME5203	Measurement and Instrumentation	3	0	0	3
4.	ME5204	Design Lab - II	0	0	3	1.5
5.	ME62XX	DE-III	3	0	0	3
6.	ME62XX	DE-IV	3	0	0	3
7.	RM6201	Research Methodology	3	1	0	4
8.	IK6201	IKS	3	0	0	3
	TOTAL		19	2	7	24.5

Sl. No.	Subject Code	SEMESTER III	L	T	P	C
1.	ME6198	Summer Internship / Mini Project*	0	0	12	3
2.	ME6199	Project I**	0	0	30	15
	TOTAL		0	0	42	18

***Note: Summer Internship (Credit based)**

(i) Summer internship (*) period of at least 60 days' (8 weeks) duration begins in the intervening summer vacation between Semester II and III. It may be pursued in industry / R&D / Academic Institutions including IIT Patna. The evaluation would comprise **combined grading based on host supervisor evaluation, project internship report after plagiarism check and seminar presentation at the Department (DAPC to coordinate)** with equal weightage of each of the three components stated herein.

(ii) Further, on return from 60 days internship, students will be evaluated for internship work through combined grading based on host supervisor evaluation, project internship report after plagiarism check, and presentation evaluation by the parent department with equal weightage of each component.

**** Note: M. Tech. Project outside the Institute:** A project-based internship may be permitted in industries/academia (outside IITP) in 3rd or 4th semester in accordance with academic regulations. In the IIIrd Semester, students can opt for a semester long M. Tech. project subject to confirmation from an Institution of repute for research project, on the assigned topic at any external Institution (Industry / R&D lab / Academic Institutions) based on recommendation of the DAPC provided:

(i.) The project topic is well defined in objective, methodology and expected outcome through an abstract and statement of the student pertaining to expertise with the proposed supervisor of the host institution and consent of the faculty member from the concerned department at IIT Patna as joint supervisor.

(ii.) The consent of both the supervisors (external and institutional) on project topic is obtained a priori and forwarded to the academic section through DAPC for approval by the competent authority for office record in the personal file of the candidate.

(iii.) Confidentiality and Non Disclosure Agreement (NDA) between the two organizations with clarity on intellectual property rights (IPR) must be executed prior to initiating the semester long project assignment and committing the same to external organization and vice versa.

(iv.) The evaluation in each semester at Institute would be mandatory and the report from Industry Supervisor will be given due weightage as defined in the Academic Regulation. Further, the final assessment of the project work on completion will be done with equal weightage for assessment of the host and Institute supervisors, project report after **plagiarism check**. The award of grade would comprise **combined assessment based on host supervisor evaluation, project report quality and seminar presentation at the Department (DAPC to coordinate)** with equal weightage of each of the components stated herein.

(v.) In case of poor progress of work and / or no contribution from external supervisor, the student need to revert back to the Institute essentially to fulfill the completion of M. Tech. project as envisaged at the time of project allotment. However, the recommendation of DAPC based on progress report and presentation would be mandatory for a final decision by the competent authority.

Sl. No.	Subject Code	SEMESTER IV	L	T	P	C
1.	ME6299	Project II**	0	0	42	21
	TOTAL		0	0	42	21

Total Credit from Semester I to IV - 88

ELECTIVE GROUPS

Department Elective - I						
Sl. No.	Subject Code	Subject	L	T	P	C
1.	ME6105	Acoustics	3	0	0	3
2.	ME6106	Mobile Robotics	3	0	0	3
3.	ME6107	Digital Manufacturing and Industry 4.0	3	0	0	3
4.	ME6108	Wear & Lubrication of Machine Components	3	0	0	3

Department Elective - II						
Sl. No.	Subject Code	Subject	L	T	P	C
1.	ME6103	Continuum Mechanics	3	0	0	3
2.	ME6109	Vehicle Dynamics and Multi-body Systems	3	0	0	3
3.	ME6110	Biomechanics	3	0	0	3
4.	ME6112	Advanced Mechanical Characterisation of Alloys	3	0	0	3

Department Elective - III						
Sl. No.	Subject Code	Subject	L	T	P	C
1.	ME6207	Rotor Dynamics	3	0	0	3
2.	ME6208	Robot Motion Planning	3	0	0	3

3.	ME6209	Non-linear Systems Dynamics	3	0	0	3
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Department Elective - IV						
Sl. No.	Subject Code	Subject	L	T	P	C
1.	ME6210	Robotics: Advanced Concepts & Analysis	3	0	0	3
2.	ME6211	Analysis of Welding Processes	3	0	0	3
3.	ME6212	Fracture and Fatigue	3	0	0	3

Interdisciplinary Elective (IDE) Course for M. Tech. (Available to students other than ME)

IDE						
Sl. No.	Subject Code	Subject	L	T	P	C
1.	ME6113	Soft Computing Application in Engineering	3	0	0	3