



**JSPM's
RAJARSHI SHAHU COLLEGE OF ENGINEERING
TATHAWADE, PUNE-33**



DEPARTMENT OF MECHANICAL ENGINEERING

**Department of Mechanical Engineering
Structure & Syllabi
M. Tech Design (2019 Pattern)
w.e.f. Academic Year 2020-2021**



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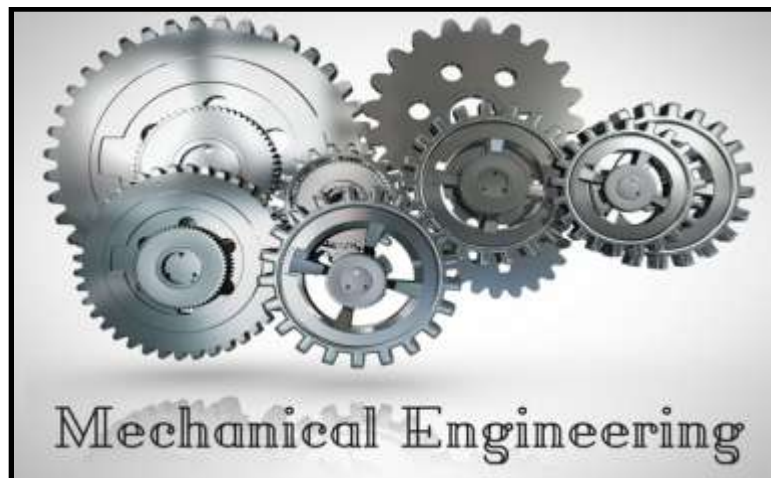
DEPARTMENT OF MECHANICAL ENGINEERING

Vision

To be regionally, nationally and internationally recognized **center of excellence** in all fields of Mechanical Engineering education where the best of teaching- learning, state-of-art **research** and **consultancy** synergize

Mission

- To inculcate basic Mechanical Engineering knowledge to students through effective **teaching-learning practices**.
- To encourage students for **higher studies, research** and **entrepreneurship**.
- To cater the needs of **society** in context of Mechanical Engineering



Dr. A. M. Badadhe
BOS Chairman (Mechanical)

Dr. S V Kedar
Dean Academics



Dr. R. K. Jain
Director RSCOE, Pune



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Program Outcomes (POs)

- 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 practices.
- 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.

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Program Specific Outcomes (PSOs)

At the end of this program, students will develop-

PSO1: Professional Skills-An ability to design solution for thermal, hydraulic systems, design components and production processes that meet the specified needs with team work and management skills for safety, societal and environmental aspects through lifelong learning.

PSO2: Problem-Solving Skills-An ability to use Modelling and Analysis tools and technologies necessary for obtaining effective, economical and accurate solutions of engineering problems.

PSO3: Professional Career and Entrepreneurship -An ability to design electromechanical and automation systems in multidisciplinary environments through better communication.

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Highlights of the Syllabus

The Curriculum of PG Program of **Design Engineering** under the **Department of Mechanical Engineering** has been designed in association with **Indian Institute of Technology, Ropar** and **Experts from Academics, industries / Corporate & Distinguish Alumni**. Major features of the curriculum are presented in the following diagram.



AMS
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Seemaal
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R. K. Jain
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Unique Features of the Curriculum

1. Curriculum centered at Outcome Based Education:

The new Curriculum is based on student-centered instruction models that focus on measuring student performance through outcomes. The outcomes include subject knowledge, industry required skills and attitudes.

2. Emphasize on Fundamentals:

The nature of the new curriculum is rigorous and well prescribed so that the students can spend more time on preparation and self-study. The students have to learn core subjects, solve practical based assignments and must attempt periodical quizzes. This will benefit them to grasp and keep a strong hold on fundamentals of Engineering in the most effective way.

3. Experiential Learning:

The curriculum emphasizes on hands-on sessions along with theoretical information, that encourage the students for hands-on learning through virtual labs, mini-projects, etc. Accordingly, the curriculum maintains good balance between theory and laboratory credits.

4. Promote Creativity and Innovation:

Along with experiential learning, the curriculum also motivates the students to inculcate creativity and innovation. Apart from conventional lab, the curriculum provides a freedom for students to perform industry assignments, pilot projects, innovative development, etc.

5. Inculcating Ethics and Values:

To improve student's behaviour, the curriculum has included systematic courses on ethics and values. The moral principles can help students to make right decisions, lead their professional lives and become ethical citizen.

6. Blend of Curricular and Extracurricular Activities

The curriculum also gives importance of different activities like co-curricular, extra-curricular, sports, culture, etc. This will help to do all round development of the students.

7. Global Competence:

The curriculum provides a unique opportunity for students to learn and engage in open and effective interaction with people from diverse and interconnected world. The combination of international internships in the curriculum helps the students to build a capacity to examine global issues and to propose perspectives and views.

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8. Industry Induced Internship Program

To support ever demanding industry requirements, the curriculum has included an industry internship with an objective to learn technologies pertaining to their discipline and enhance their technical knowledge with a support of the live platform of Industry.

9. Motivation for Self Learning:

The curriculum also offers a freedom to students to take the initiatives in their learning needs and set the goals with the help of online learning platforms like MOOCs, NPTEL, Swayam, etc.

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**F. Y. M. Tech Mechanical Engineering (Design Engineering)
Semester -I**

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks							Credits			
		TH	TU	PR	IS (15)	MSE (25)	ESE (60)	TW	PR	OR	Total	TH	TU	PR	Total
ME5101	Machine Stress Analysis	4	-	-	15	25	60	-	-	-	100	4	-	-	4
ME5102	Mechanical Vibrations	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ME5103	Elective -I	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ME5104	Elective -II	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ES5102	Advanced Mathematics	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ME5105	Design Lab -I	-	-	4	-	-	-	50	-	50	100	-	-	2	2
ME5106	Online course/ certification	-	-	4	-	-	-	50	-	50	100	-	-	2	2
ME5107	Audit Course	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total		16	-	8	75	125	300	100	-	100	700	16	-	4	20

Select Any One			
Elective-I		Elective-II	
Code No.	Title	Code No.	Title
ME5103A	Design Engineering	ME5104A	Design of Composite Materials
ME5103B	Design for Manufacturing & Assembly	ME5104B	Tribology
ME5103C	Reliability In Engineering	ME5104C	Pressure vessels Design
ME5103D	Nonlinear System Analysis	ME5104D	Vehicle Dynamics

Name of Audit Courses			
EC5108	Technical Paper writing	ME5107	Value Education In Engineering
CE5107	Disaster Management	CS5108	Constitution of India

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**F. Y. M. Tech Mechanical Engineering (Design Engineering)
Semester -II**

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks							Credits			
		TH	TU	PR	IS (15)	MSE (25)	ESE (60)	TW	PR	OR	Total	TH	TU	PR	Total
ME5108	Finite Element Analysis	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ME5109	Kinematics and Synthesis of Mechanisms	4	-	-	15	25	60	-	-	-	100	4	-	-	4
ME5110	Research Methodology	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ME5111	Elective -III	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ME5112	Elective -IV	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ME5113	Design Lab -II	-	-	4	-	-	-	50	-	50	100	-	-	2	2
Total		16	-	4	75	125	300	50	-	50	600	16	-	2	18

Select Any One			
Elective-III		Elective-IV	
Code No.	Title	Code No.	Title
ME5111A	Robotics in Engineering	ME5112A	Condition Based Monitoring
ME5111B	Fracture Mechanics	ME5112B	Optimization Techniques in Design
ME5111C	Friction and Wear in Machinery	ME5112C	Elastic Analysis of Plates and Shells
ME5111D	Continuum Mechanics	ME5112D	Neural Networks Fuzzy Systems and Applications

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**S. Y. M. Tech Mechanical Engineering (Design Engineering)
Semester -I**

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks							Credits			
		TH	TU	PR	IS (15)	MSE (25)	ESE (60)	TW	PR	OR	Total	TH	TU	PR	Total
ME6101	Elective-V	3	-	-	15	25	60	-	-	-	100	3	-	-	3
ME6102	Internship/ Value Added course (VAC)	-	-	-	-	-	-	50	-	50	100	3	-	-	3
ME6103	Dissertation Phase-I	-	-	-	-	-	-	150	-	50	200	6	-	-	6
Total of Semester-III		3	-	-	15	25	60	200	-	100	400	12	-	-	12

Elective-V

Code No.	Title
ME6101A	Industrial Safety
ME6101B	Microforming in design
ME6101C	Operation Research
ME6101D open	Interdisciplinary Elective Subject offered by other department

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**S. Y. M. Tech Mechanical Engineering (Design Engineering)
Semester -II**

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks							Credits			
		TH	TU	PR	IS (15)	MSE (25)	ESE (60)	TW	PR	OR	Total	TH	TU	PR	Total
ME6104	Internship/ Value added course (VAC)	-	-	-	-	-	-	50	-	50	100	3	-	-	3
ME6105	Dissertation Phase-II (Industry/Research)	-	-	-	-	-	-	250	-	150	100	17	-	-	17
Total of Semester-IV		-	-	-	-	-	-	300	-	200	500	20	-	-	20

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