



SHIV NADAR UNIVERSITY

**DEPARTMENT
OF
MECHANICAL ENGINEERING
SCHOOL OF ENGINEERING**

UNDERGRADUATE (B.TECH.) PROSPECTUS

(2018-2019)

FOR

DEPARTMENT OF MECHANICAL ENGINEERING

I. Overview of Department of Mechanical Engineering

Mechanical Engineering plays a major role in structuring the real world, the systems we use, the means by which we commute and the energy that powers these to deliver the basic necessities of life. Mechanical engineers design, manufacture and maintain machinery used by all disciplines of engineering. This discipline has attracted outstanding individuals and helped in addressing the crucial technical challenges in the contemporary world. The career path of a mechanical engineer is largely determined by individual choice – a unique advantage in an ever-changing competitive world. The studies of mechanical engineers focus on material science, solid and fluid mechanics, thermodynamics, heat transfer, controls, hydraulic machines, design and manufacturing. To summarize, the versatility, wide-ranging scope and universal relevance of mechanical engineering opens up career avenues in all possible branches of the engineering profession.

The faculty in the department mostly teach the subjects they specialize in during their research and industry experience. Thus imparting knowledge that goes far beyond class room learning. Results are obvious when more than 10% of our graduates go on for post graduate studies and some even go straight for doctorate. More than half the faculty in the department have funded research projects from government agencies and all are active in research. The students get the unique opportunity to participate in research at the undergraduate level, which is a rarity in India. Schemes such as Opportunity for Undergraduate Research (OUR) fund such research activities. Engineering and mechanical engineering in particular has great potential, however it is important to have a vision of future in order to thrive in this field and our curriculum and academic environment are fine tuned to allow budding engineers to reach their full potential. Presently the mechanical engineering department offers the following program at Undergraduate level:

Undergraduate Program

Bachelor of Technology in Mechanical Engineering with the option of doing minor in any other stream of interest.

Programme Educational Objectives (PEO)

The Mechanical Engineering Program at SNU is designed to create and disseminate multidisciplinary strategic knowledge of the discipline and develop efficient, eco-friendly systems to cater the need of the industries and academic community.

To department is envisioned to nurture the Mechanical Engineers in some emerging area namely Green Energy Technology Systems, High-Performance Computing, Advanced Materials and Manufacturing domains by addressing the relevant needs and challenges of the country. The department is offering a plethora of subjects along with three programs (B. Tech, M. Tech and Ph.D.) and some state of the art laboratory facilities towards imparting complete knowledge through experiential learning and skill development so that students can face any technological challenges and can come up with efficient and sustainable solutions.

Our students and researchers are expected to:

- Understand fundamental theory and apply their engineering knowledge and critical thinking to solve real world challenging Mechanical Engineering problems. The skills we impart on the students will be extremely valuable for their professional growth or contribution in non-engineering fields or business.
- Our department is focusing on converging domain of Mechanical Engineering Education so that they will be industry ready as per the current industry trends and a lifelong learner.
- Penetrate heart of the converging technologies and improve continuously for the benefit of the community.

Programme Outcomes (PO)

- **Basic and Applied Science Understanding:** Learning Basic Engineering Mathematics, Engineering Physics, Engineering Chemistry.
- **Basic Engineering knowledge-** Learning applied mathematics, applied science, engineering fundamentals, and apply to the engineering problems and technological developments.
- **Problem definition** – Review research literature, identify the correct physics, formulate the problem, and analyses complex engineering problems.
- **Design/development of indigenous solutions-** We focus on creative design part satisfying all design criteria, accomplish the task and meet the specific objectives also the design should not have any adverse effect on the environment and society.
- **Capability/Skill Development:** Department is always striving for using modern baseline tool and develop in-house capabilities to address technological challenges.
- **Research Based Knowledge Development** – Our objective is to indulge strategic research and use research-based knowledge and research methodology including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

- **Making Expert in Emerging Domain:** Department is having four thrust areas (Energy Tech, Computational Tech, Surface Engg., and Adv. Mfg.) and students are trained in these areas so that they will be ready to contribute what industry needs today.
- **Contribution to society as an engineer** – Able to assess the societal impact, health issues, safety concerns, legal aspect along with cultural issues of the engineering systems and policies. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable solution.
- **Individual and team work-** Department is focusing to make each students to be able to work in a team and how they can get success as an individual by assigning them group projects and individual task. They participate many competitions and present their work reputed conference or workshop to gain visibility of department and institute.
- **Responsible Class I Professional:** Our students will be tomorrows Grade I people of the society so we take utmost care to shape them and make a complete responsible engineer,
- **Effective in Communication-** Communicate effectively on complex engineering activities with the world in a simpler way so that anyone can understand and act responsibly.
- **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.
- **Ethics:** Our engineers should carry ethics and act as responsible high-class citizen of the country. Also they should follow norms and policies in their engineering practice.
- **Transformation and not information:** Our all programs focuses to transform each to a fullest engineers or researchers through education so that they really can contribute towards service to the nation.

Programme Specific Outcomes (PSO)

Mechanical Engineering Graduates (B. Tech Program) will be able to

- To make India's breeding platform for fundamental and strategic Mechanical Engineering education. Empower the students to apply their knowledge and acquired skills in broad ME streams such as thermofluids, design, manufacturing and industrial engineering.
- Apply knowledge of mathematics, science, and engineering to solve real world and industry problems.
- Design and conduct experiments to come up with strategic solution so that the product can be useful to the society or community.

- To be able to synthesize the system, components, or arrive to optimal process to meet expectation of the market and also satisfy the constraint of economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Address to interdisciplinary/multidisciplinary problems and focusing on transformation of the students over four years.
- Our B. Tech graduates should be able to identify, formulate, and solve critical engineering and technological problems.
- Come up with a life-long learner and be able to communicate effectively with the world and possess ethical responsibility.
- Gain knowledge and transform themselves from ignorant being to a complete Mechanical Engineer with strategic knowledge and skills required by current industries and society.
- An understanding of professional and ethical responsibility

II. Credit Break-up of UG Curriculum in Mechanical Engineering

Our balanced curriculum has a number of sub categories from which the students need to secure minimum credits. Every student has to secure the minimum credits as given in the table below. Being a university we have the freedom to constantly update the content of our courses to allow the best of knowledge to be imparted.

Department of Mechanical Engineering

Revised Credit Distribution		Total number of Credits: 160
S. No.	Category	New Credits
1	Core Common Curriculum (CCC)	18
2	University Wide Elective (UWE)	18
3	CCC/UWE	6
4	Basic Sciences (BS)	20
5	Engineering Sciences (ES)	9
6	Major Core	65
7	Major Elective	9
8	Project I + Project II	15
Total Credits		160

Basic Sciences				Total number of Credits: 20 Credits
S. No.	Course Code	Course	L:T:P	Credits
1	PHY101	Physics-1	3:1:0	4
2	MAT201	Maths-1	3:1:0	4
3	MAT203	Maths-2	3:1:0	4
4	PHY102	Physics-2	3:1:1	5
5	MAT205	Maths-3	3:0:0	3
Total Credits				20
Engineering Sciences				Total number of Credits: 9 Credits
S. No.	Course Code	Course	New L:T:P	Credits
1	CSD101	Introduction to Computing and Programming	3:0:1	4
2	EED101	Introduction to Electrical Engineering	3:1:1	5
Total Credits				9
Major Core				Total number of Credits: 65 Credits
S. No.	Course Code	Course	L:T:P	Credits
1	MED101	Manufacturing Processes	1:0:1	2
2	MED104	Engineering Graphics and Design	1:0:1	2
3	MED105	Engineering Mechanics: Statics and Dynamics	3:1:0	4
4	MED201	Materials Science and Engineering	3:0:1	4
5	MED203	Mechanics of Solids	3:0:1	4
6	MED204	Kinematics and Dynamics of Machines	3:0:1	4
7	MED205	Engineering Thermodynamics	2:1:0	3
8	MED208	Manufacturing Sciences	3:0:1	4
9	MED209	Mechanical Engineering Design & Graphics	2:0:1	3
10	MED210	Principles of Industrial Engineering	2:0:0	2
11	MED211	Mechanics of Fluids	3:0:1	4
12	MED212	Machine Design	2:0:0	2
13	MED301	Applied Thermodynamics	2:1:0	3
14	MED303	Heat and Mass Transfer	3:0:1	4
15	MED305	Refrigeration & Air Conditioning	2:0:1	3
16	MED306	Fluid Machinery	2:0:1	3

17	MED309	Operations Research	2:1:0	3
18	MED314	Computer Aided Design & Manufacturing	2:0:1	3
19	MED315	I. C. Engines & Automobiles	3:0:1	4
20	MED412	Mechatronics & Control System	2:1:1	4
Total Credits				65

First Semester

S. No.	Course Code	Course Title	L:T:P	Credits
1		CCC 1		3
2	MAT201	Maths-1	3:1:0	4
3	PHY101	Physics-1	3:1:0	4
4	MED101	Manufacturing Process	1:0:1	2
5	EED101	Introduction to Electrical Engineering	3:1:1	5
6	MED104	Engineering Graphics	1:0:1	2
Semester Credits				20

Second Semester

S. No.	Course Code	Course Title	L:T: P	Credits
1		CCC 2		3
2		CCC 3		3
3	MAT203	Maths-2	3:1:0	4
4	PHY102	Physics-2	3:1:1	5
5	CSD101	Introduction to Computing and Programming	3:0:1	4
6	MED105	Engineering Mechanics: Statics and Dynamics	3:1:0	4
Semester Credits				23

Third Semester

S. No.	Course Code	Course Title	L:T: P	Credits
1		CCC 4		3
2	MAT205	Maths-3	3:0:0	3
3	MED201	Materials Science and Engineering	3:0:1	4
4	MED203	Mechanics of Solids	3:0:1	4
5	MED211	Mechanics of Fluids	3:0:1	4
6	MED208	Manufacturing Sciences	3:0:1	4

7		UWE- I		3
Semester Credits				25

Fourth Semester

S. No.	Course Code	Course Title	L:T: P	Credits
1		CCC 5		3
2	MED205	Engineering Thermodynamics	2:1:0	3
3	MED204	Kinematics and Dynamics of Machines	3:0:1	4
4	MED209	Mechanical Engineering Design & Graphics	2:0:1	3
5	MED210	Principles of Industrial Engineering	2:0:0	2
6		UWE II		3
Semester Credits				18

Fifth Semester

S. No.	Course Code	Course Title	L:T: P	Credits
1		CCC 6		3
2		CCC 7/UWE		3
3	MED301	Applied Thermodynamics	2:1:0	3
4	MED309	Operations Research	2:0:0	3
5	MED303	Heat and Mass Transfer	2:0:1	4
6	MED212	Machine Design	2:0:0	2
7		UWE- III		3
Semester Credits				21

Sixth Semester

S. No.	Course Code	Course Title	L:T: P	Credits
1		CCC 8/UWE		3
2	MED305	Refrigeration & Air Conditioning	2:0:1	3
3	MED306	Fluid Machinery	2:0:1	3
4	MED314	Computer Aided Design and Manufacturing	2:0:1	3
5		UWE-IV	3:0:0	3
6		UWE-V	3:0:0	3
7		Major Elective -I	3:0:0	3
Semester Credits				21

Seventh Semester

S. No.	Course Code	Course Title	L:T: P	Credits
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1	MED412	Mechatronics & Control System	2:1:1	4
2	MED315	I. C. Engines & Automobiles	3:0:1	4
3		Major Elective - II	3:0:1	3
4		Major Elective - III	3:0:0	3
4		UWE-VI	3:0:0	3
5	MED497	Project-1	0:0:3	3
Semester Credits				20

Eighth Semester

S. No.	Course Code	Course Title	L:T:P	Credits
1	MED498	Project-2	0:0:12	12
Semester Credits				12

Major Elective 09 Credits (With Specialization Track)

Track 1 : Computational Techniques in Mechanical Engineering

S. No.	Course Code	Course	L:T:P	Credits
1	MED307	Finite Element Method	3:0:0	3
2	MED404	Adv. Comp. Programing & Num. Techniques	3:0:0	3
3	MED410	Computational Fluid Dynamics	3:0:0	3
4	MED415	Mechanical Vibrations	3:0:0	3

Track 2 : Production Technology and Industrial Engineering

S. No.	Course Code	Course	L:T:P	Credits
1	MED313	Computer Integrated Manufacturing	3:0:0	3
2	MED316	Advanced Manufacturing Processes	3:0:0	3
3	MED318	Supply Chain Management	3:0:0	3

Track 3 : Energy Technology

S. No.	Course Code	Course	L:T:P	Credits
1	MED308	Power Plant Engineering	3:0:0	3
2	MED403	Solar Energy	3:0:0	3
3	MED410	Computational Fluid Dynamics	3:0:0	3
4	MED413	Energy Conv. Tech. and Energy Management	3:0:0	3

Track 4 : Manufacturing and Surface Engineering

S. No.	Course Code	Course	L:T:P	Credits
1	MED316	Advanced Manufacturing Processes	3:0:0	3
2	MED322	Advanced materials and Applied Tribology	3:0:0	3
3	MED414	Surface Engineering	3:0:0	3

Note: Any three courses for any specialization Track are needed to claim that specialization Track.

Minor Course List

Minor for SHSS and SME students offered by Mechanical Engineering Department

S. No.	Course Code	Course Name	Credits	Prerequisites
1	MED101	Manufacturing Processes	1:0:1	None
2	MED104	Engineering Graphics and Design	1:0:1	None
3	MED105	Engineering Mechanics: Statics and Dynamics	3:1:0	None
4	MED205	Engineering Thermodynamics	2:1:0	None
5	MED210	Principles of Industrial Engineering (PIE) or OR	2:0:0	None
6	MED211	Mechanics of Fluids or Fluid Machinery	3:0:1	None

Minor for Civil and SoNS students offered by Mechanical Engineering Department

S. No.	Course Code	Course Name	Credits	Prerequisites
1	MED101	Manufacturing Processes	1:0:1	None
2	MED205	Engineering Thermodynamics	2:1:0	None
3	MED206	Kinematics & Dynamics of Machines	3-0-1	Engineering Mechanics
4	MED210	PIE or OR	2:0:0	None
5	MED303	Heat and Mass Transfer	3:0:1	Engg. Thermodynamics
6	MED306	Fluid Machinery	2:0:1	Mechanics of Fluids

Minor for Chemical Students Offered by Mechanical Engineering Department

S. No.	Course Code	Course Name	Credits	Prerequisites
1	MED203	Mechanics of Solids or Strength of Materials	3:0:1	None
2	MED206	Kinematics & Dynamics of Machines	3:0:1	Engineering Mechanics
3	MED210	Principles of Industrial Engineering	2:0:0	None
4	MED306	Fluid Machinery	2:0:1	Mechanics of Fluids
5	MED309	Operations Research (OR)	2:1:0	None
6	MED314	Computer Aided Design & Manufacturing	2:0:1	Manufacturing Science, Machine Design

Minor for CS/ECE/EE students offered by Mechanical Engineering Department

S. No.	Course Code	Course Name	Credits	Prerequisites
1	MED101	Manufacturing Processes	1:0:1	None
2	MED104	Engineering Graphics and Design or OR or PIE	1:0:1	None
3	MED105	Engineering Mechanics: Statics and Dynamics	3:1:0	None
4	MED204	Kinematics and Dynamics of Machines or Fluid Machinery	3:0:1	Engineering Mechanics, Mechanics of Solids
5	MED205	Engineering Thermodynamics	2:1:0	None
6	MED211	Mechanics of Fluids or Fluid Mechanics	3:0:1	None