SGT University, Chandu-Budhera, Gurugram
Faculty of Engineering & Technology
Department of Mechanical Engineering

- B. Tech. Mechanical Engineering with specialization in (Robotics, Machine Design, Thermal Engineering, Computer Enable Manufacturing, Automotive Design and Development, Mechatronics, and Electric Vehicles) (Honours)
- B. Tech. Mechanical Engineering with Minor Degree in Computer Science Engineering
- B. Tech. Mechanical Engineering with Minor Degree in Artificial Intelligence and Machine Learning.

Scheme & Syllabus (2021-22)

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Vision of SGT University

"Driven by Research & Innovation, we aspire to be amongst the top ten Universities in the Country by 2022"

Vision of the Department

Department endeavors to be recognized globally through outstanding education & research that produces qualified engineers who are ready to cater the everchanging industrial and social demands.

Mission of the department

- To create environment conducive for the quality teaching-learning interdisciplinary research and innovation.
- To establish academic system facilitating real learning in Mechanical Engineering.
- To prepare the graduates be leader in the profession.
- To inculcate universal human values, professional ethics and life-long learning attitude.
- To empower the learners to device their own unique path of education for acquiring multi specializations and skills.

Program Specific Outcomes (PSOs)

Mechanical Engineering Graduates will be able to:

PSO1 Apply viable aptitudes, learning in significant streams, for example, Thermal, Design, Mechatronics, Manufacturing, Production and Industrial Engineering.

PSO2 Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

PSO3 Improve team building, team working and leadership skills of the students with high regard for ethical values and social responsibilities. Communicate effectively and demonstrate the knowledge of project management and independent research.

Program Educational Objectives (PEOs)

PEO1 To impart to the students' knowledge of contemporary science and mechanical engineering related subjects.

PEO2 To enhance analytical skills of the students for decision making.

PEO3 To provide opportunity to the students to expand their horizon beyond mechanical engineering.

PEO 4 To prepare the students to take-up career in different industries or to pursue higher studies in mechanical and interdisciplinary programs

PEO 5 To create awareness amongst the students towards social, environmental and energy related issues.

Program Outcomes (POs)

At the end of the Bachelor of Technology in Mechanical Engineering program graduates will be able to:

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

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex mechanical engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

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PO3: Design / Development of Solutions: Design solutions for complex mechanical engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and the cultural, societal, and environmental considerations.

PO4: 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.

PO5: Modern Tools Usage: Create, select, and apply proper procedure, resources, and current engineering and mechanical tools including prediction and modelling to complex engineering activities in mechanical engineering with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning inferred by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the 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 Team work: Function effectively as an individual, and as a member or leader in diverse teams, and multidisciplinary settings.

PO10: 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.

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: Lifelong 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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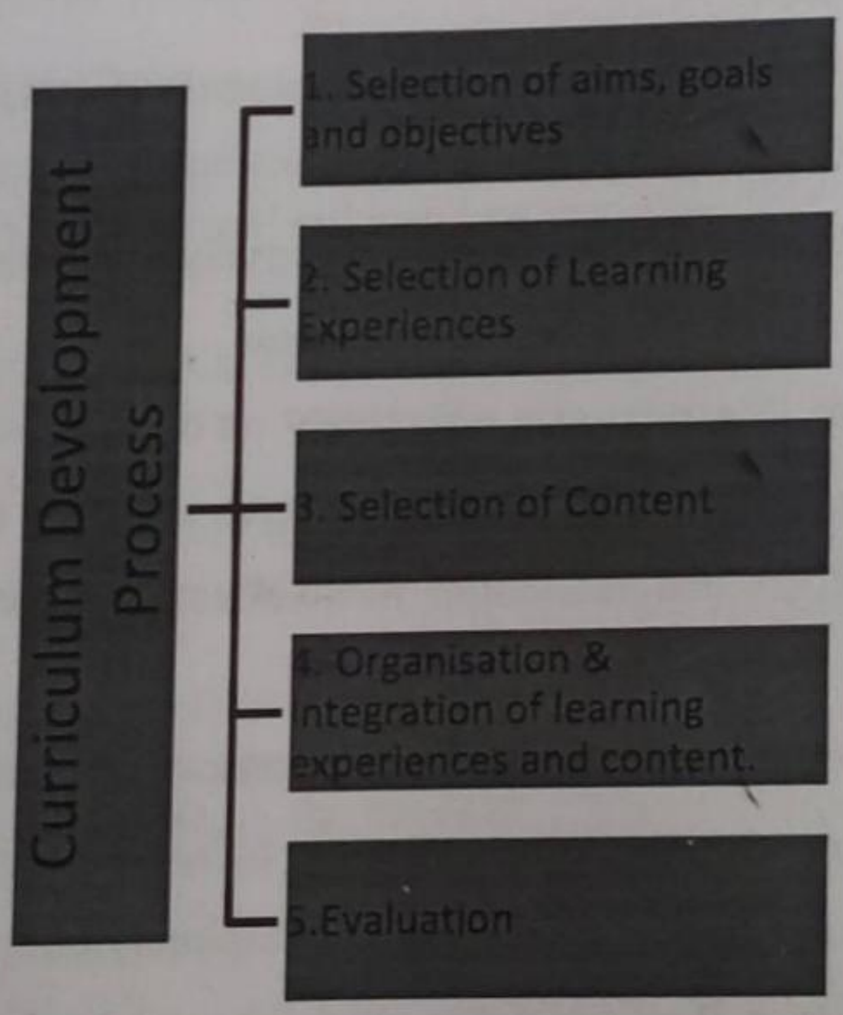
Curriculum Design & Development Process

Engineering Science is a new concept of multidisciplinary program that emphasizes enhanced understanding and integrated application of engineering, science and mathematics. B. Tech. in Mechanical Engineering gaining greater acceptance from the employers, as student are industry ready possessing greater skills. The B.Tech. courses are being carefully crafted after integrating inputs from leading national and international experts both from industries as well as academia. Here are some of the highlights of the program.

- Departmental subjects are introduced from 3rd semester onwards. The curriculum is based on a unique mix of basic sciences, humanities, core engineering, and discipline-specific subjects.
- There are many choices of elective subjects, which may or may not be related to the parent discipline comes under open elective.
- The Choice based credit system is introduced. CBCS provides a "cafeteria" type approach in which the students can take courses of their choice, learn as per interest, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.
- Huge emphasis is given on the industrial projects to address real-life issues and problems faced by the industries. Students are encouraged and facilitated to undergo training and internship during summer vacation to industries and/or national and international universities/research laboratories



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List of programs being offered by the Department (with broad credit distribution)

A. B. Tech. Program

1. B. Tech. Mechanical Engineering with specialization in (Robotics, Machine Design, Thermal Engineering, Computer Enable Manufacturing, Automotive Design and Development, Mechatronics, and Electric Vehicles)

2. B. Tech. Mechanical Engineering with Minor Degree in Computer Science Engineering

3. B. Tech. Mechanical Engineering with Minor Degree in Artificial Intelligence and Machine Learning.

Note:

1. A student will be eligible to get Under Graduate degree with **Honours**, if he/she completes an additional 18-20 credits. These can be acquired through SWAYAM MOOCs. The list of MOOC courses will be provided by the Departement to the students before commencement of the semester.
2. Student can opt for any of the Open Elective, Value Added Course and Ability Enhancement Courses subject outside from the Parent Institute leading to Holistic Development of student. It may include Yoga, Dance, Fashion, Agriculture, Medicine, etc. These courses as mentioned in the curriculum can be opted from the University Pool which is circulated before the commencement of semester classes.
3. Students entring directly in 2nd and 3rd year with Certifciate Course and Dipoma will be given Undergradute Diploma considering their credits of previous courses after successfully completion of 3rd year but the student need to submit his original previous certificate.
4. Students can opt for B.Tech. Mechanical Engineering with Specialization (As stated above) before commencement of the Course with prior information the Department in accordance with the eligibility criteria defined by the Academic council from time to time. As per the current criteria, a student can get B. Tech. Mechanical Engineering with Specialization Degree if she/he has 18-20 more credits of a same specialization throughout his/her program.
5. Students can opt for B.Tech. Mechanical Engineering with Minor Degree in Computer Science Engineering/ Artificial Intelligence and Machine Learning before commencement of the Course with prior information the Department in accordance with the eligibility criteria defined by the Academic council from time to time. As per the current criteria, a student can get B. Tech. Mechanical Engineering with Minor Degree in Computer Science Engineering/ Artificial Intelligence and Machine Learning if she/he has 18-20 more credits of a same specialization throughout his/her program.

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Scheme of Examination for B.Tech. (Mechanical Engineering) Program, 1st year

SEMESTER WISE COURSE STRUCTURE 2021-2022

First Semester

S. No.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Int.	Ext.	
1		Applied Mathematics	3	0	0	3	40	60	100
2		Design Thinking	3	0	0	3	40	60	100
3		Basics of Mechanical Engineering	3	0	0	3	40	60	100
4		Biology for Engineers	3	0	0	3	40	60	100
5		Material Engineering and Technology	3	0	0	3	40	60	100
6		Value Addition Course-I	2	0	0	2	40	60	100
7		Ability Enhancement Course-I	2	0	0	2	40	60	100
8		Metrology and Material Engineering Lab	0	0	2	1	60	40	100
9		Workshop Technology Lab	0	0	2	1	60	40	100
10		Engineering Graphics and Design Lab	0	0	2	1	60	40	100
		Total	**19**	**0**	**06**	**22**	**460**	**540**	**1000**

Second Semester

S. No.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Int.	Ext.	
1		Applied Physics	3	0	0	3	40	60	100
2		Engineering Thermodynamics	3	0	0	3	40	60	100
3		Advance Graphics and Design	2	0	0	2	40	60	100
4		Basics of Automobile Engineering	3	0	0	3	40	60	100
5		Probability and Statistics	3	0	0	3	40	60	100
6		Ability Enhancement Course-II	2	0	0	2	40	60	100
7		Engineering Thermodynamics Lab	0	0	2	1	60	40	100
8		Advance Graphics and Design Lab	0	0	2	1	60	40	100
9		Basics of Automobile Engineering Lab	0	0	2	1	60	40	100
10		Object Oriented Programming Lab	0	0	2	1	60	40	100
		Total	**16**	**0**	**08**	**20**	**500**	**500**	**1000**

Note:-

1. 4 weeks mandatory Industrial Internship of 2 credits after completetion of 1st year.

Exit Point

Certification Course in Mechanical Engineering.

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Entry Point

Three years Diploma or One year Certification Course in Mechanical Engineering and in lieu of Industrial Internship of 4 weeks student has to complete MOOC Course of 4 weeks (2 Credits) in 3rd semester.

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Scheme of Examination for B.Tech. (Mechanical Engineering) Program 2nd year

SEMESTER WISE COURSE STRUCTURE 2021-2022

Third Semester

S.NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Int.	Ext.	
1.		Strength of Materials	3	0	0	3	40	60	100
2.		Engineering Mechanics	3	0	0	3	40	60	100
3.		Department Electives-I	3	0	0	3	40	60	100
4.		Department Electives-II	3	0	0	3	40	60	100
5.		Open Elective-I	4	0	0	4	40	60	100
6.		Value Addition Course-II	2	0	0	2	40	60	100
7.		Strength of Materials Lab	0	0	2	1	60	40	100
8.		Engineering Mechanics Lab	0	0	2	1	60	40	100
9.		Department Electives-I Lab	0	0	2	1	60	40	100
10.		Department Electives-II Lab	0	0	2	1	60	40	100
11.		Industrial Internship	0	0	4w	2	60	40	100
		Total	**18**	**0**	**08**	**24**	**540**	**560**	**1100**

Fourth Semester

S.NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Int.	Ext.	
1.		Mechanical Machine Design	3	0	0	3	40	60	100
2.		Manufacturing Processes and Technology	3	0	0	3	40	60	100
3.		Research Methodology	3	0	0	3	40	60	100
4.		Department Electives-III	3	0	0	3	40	60	100
5.		Department Electives-IV	3	0	0	3	40	60	100
6.		Open Elective-II	4	0	0	4	40	60	100
7.		Mechanical Machine Design Lab	0	0	2	1	60	40	100
8.		Manufacturing Processes Lab	0	0	2	1	60	40	100
9.		Department Electives-III Lab	0	0	2	1	60	40	100
10.		Department Electives-IV Lab	0	0	2	1	60	40	100
		Total	**19**	**0**	**08**	**23**	**480**	**520**	**1000**

Note: -

1. 4 weeks mandatory Industrial Training-I of 2 credits after completetion of 2nd year.

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Specialization Stream for Department Electives	Department Electives-I	Department Electives-II	Department Electives-III	Department Electives-IV
Thermal	Refrigeration & Air Conditioning 3-0-2 (4)	Steam Power Generation 3-0-2 (4)	Cryogenic Engineering 3-0-2 (4)	Fluid Power System 3-0-2 (4)
Manufacturing	Advanced Machining Processes 3-0-2 (4)	Production Planning & Control 3-0-2 (4)	Computer Aided Manufacturing 3-0-2 (4)	CNC Programming 3-0-2 (4)
Automotive Technology	Advance Automobile Engineering 3-0-2 (4)	Fuel & Combustion 3-0-2 (4)	Hydrogen and Fuel Cells 3-0-2 (4)	Chassis Design 3-0-2 (4)
Industrial Engineering & Management	Industrial Engineering 3-0-2 (4)	Estimation & Costing / Total Quality Management 3-0-2 (4)	Plant Layout and Material Handling / Lean enterprise & Advanced Manufacturing Technologies 3-0-2 (4)	Work Study/Supply Chain and Logistic Managements 3-0-2 (4)
Machine Design	Product Design for Manufacturing 3-0-2 (4)	Tool Design 3-0-2 (4)	Mechanical Vibration 3-0-2 (4)	Finite Element Methods 3-0-2 (4)
Material & Metallurgy	Advance Materials 3-0-2 (4)	Composite Materials 3-0-2 (4)	Nanomaterials 3-0-2 (4)	Biomaterials 3-0-2 (4)

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Exit Point

Diploma in Mechanical Engineering with specialization in_____.

Entry Point

Certification Course in Mechanical Engineering and in lieu of Industrial Training-I of 6 weeks student has to complete MOOC Course of atleast 6 weeks (3 Credits) in 5th semester.

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Scheme of Examination for B.Tech. (Mechanical Engineering) Program

SEMESTER WISE COURSE STRUCTURE 2021-2022

Fifth Semester

S.NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Int.	Ext.	
1.		Fluid Mechanics and Machines	3	0	0	3	40	60	100
2.		Kinematics of Machines	3	0	0	3	40	60	100
3.		Department Electives-V	3	0	0	3	40	60	100
4.		Department Electives-VI	3	0	0	3	40	60	100
5.		Open Elective-III	4	0	0	4	40	60	100
6.		Ability Enhancement Course-III	2	0	0	2	40	60	100
7.		Fluid Mechanics and Machines Lab	0	0	4	2	60	40	100
8.		Kinematics of Machines Lab	0	0	2	1	60	40	100
9.		Department Electives-V Lab	0	0	2	1	60	40	100
10.		Department Electives-VI Lab	0	0	2	1	60	40	100
11.		Industrial Training-I	0	0	4w	2	60	40	100
		Total	**18**	**0**	**10**	**25**	**500**	**500**	**1000**

Sixth Semester

S.NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Int.	Ext.	
1.		Heat and Mass Transfer	3	0	0	3	40	60	100
2.		Dynamics of Machines	3	0	0	3	40	60	100
3.		Department Electives-VII	3	0	0	3	40	60	100
4.		Department Electives-VIII	3	0	0	3	40	60	100
5.		Open Elective-IV	4	0	0	4	40	60	100
6.		Value Addition Course-III	2	0	0	2	40	60	100
7.		Heat and Mass Transfer Lab	0	0	2	1	60	40	100
8.		Dynamics of Machines Lab	0	0	2	1	60	40	100
9.		Department Electives-VII Lab	0	0	2	1	60	40	100
10.		Department Electives-VIII Lab	0	0	2	1	60	40	100
		Total	**18**	**0**	**08**	**22**	**480**	**520**	**1000**

Note:-

1. 4 weeks mandatory Industrial Training-II of 2 credits after completetion of 3rd year.

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Department Electives Specialization Streams	Department Electives-V	Department Electives -VI	Department Electives- VII	Department Electives-VIII
Robotics	Robotics Engineering & Applications 3-0-2 (4)	Sensors & Actuators 3-0-2 (4)	Pneumatics & Control 3-0-2 (4)	Mobile Robots 3-0-2 (4)
Thermal Engineering	Solar & Nuclear Power Engineering 3-0-2 (4)	Design of Thermal Systems 3-0-2 (4)	Power Plant Engineering 3-0-2 (4)	Computational Fluid Dynamics 3-0-2 (4)
Computer Enable Manufacturing	Rapid Manufacturing Technologies 3-0-2 (4)	Non-Conventional Machining 3-0-2 (4)	Non-Destructive Evaluation & Testing 3-0-2 (4)	Press Tools & Dies 3-0-2 (4)
Machine Design	Design for Manufacturing & Assembly 3-0-2 (4)	Mechanism & Manipulator Design 3-0-2 (4)	Advance Tribology 3-0-2 (4)	Finite Element Analysis 3-0-2 (4)
Automotive Design & Development	Advance Automotive Electronics 3-0-2 (4)	Engine Design 3-0-2 (4)	Design of Transmission System 3-0-2 (4)	Vehicle Body Dynamics 3-0-2 (4)
Mechatronics	Mechatronics Systems and its Applications 3-0-2 (4)	Sensors & Actuators 3-0-2 (4)	Pneumatics & Control 3-0-2 (4)	MEMS & Micro-Systems 3-0-2 (4)
Electric Vehicles	Introduction to Hybrid and Electric Vehicles 3-0-2 (4)	Battery Management System 3-0-2 (4)	Plug-in Electric Vehicles in Smart Grid 3-0-2 (4)	EV Charging Infrastructure Technology 3-0-2 (4)

Exit Point

Undergraduate Diploma in Mechanical Engineering with specialization in_____.

Entry Point

Diploma in Mechanical Engineering and in lieu of Industrial Training of 6 weeks student has to complete MOOC Course of atleast 6 weeks (3 Credits) in 7th semester.

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Scheme of Examination for B.Tech. (Mechanical Engineering) Program 4th year

SEMESTER WISE COURSE STRUCTURE 2021-2022

Seventh Semester

S. NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Int.	Ext.	
1.		Automation in Manufacturing	3	0	0	3	40	60	100
2.		Department Electives-IX	3	0	0	3	40	60	100
3.		Department Electives-X	3	0	0	3	40	60	100
4.		Value Addition Course-IV	2	0	0	2	40	60	100
5.		Ability Enhancement Course-IV	2	0	0	2	40	60	100
6.		Automation in Manufacturing Lab	0	0	2	1	60	40	100
7.		Department Electives Lab-IX	0	0	2	1	60	40	100
8.		Department Electives Lab-X	0	0	2	1	60	40	100
9.		Capstone Project	0	0	4	2	60	40	100
10.		Industrial Training-II	0	0	4w	2	60	40	100
		Total	**13**	**0**	**10**	**20**	**500**	**500**	**1000**

Eighth Semester

S.NO.	Subject Code	Course Title	L	T	P	C	Examination marks		Subject Total
							Int.	Ext.	
1.		Industrial Internship with Project (Industrial oriented/Research oriented)	-	-	20 W	**10**	100	100	**200**
	Total Credits = 10								
	Overall Total Credits = I to VIII= 166								

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Department Electives	Department Electives-IX	Department Electives-X
Thermal	Nuclear Power Engineering 3-0-2 (4)	Advance Heat Transfer 3-0-2 (4)
Computer Enable Manufacturing	Machine Tool Technology 3-0-2 (4)	Modelling and Simulation of Manufacturing System 3-0-2 (4)
Automotive Technology	Recent Trends in Automotive Technology 3-0-2 (4)	Gas Dynamics & Jet Propulsion 3-0-2 (4)
Industrial Engineering & Management	Maintenance Engineering / Operation Research 3-0-2 (4)	Industrial Safety Engineering / Sales & Marketing 3-0-2 (4)
Mechatronics	Instrumentation & Control Engineering 3-0-2 (4)	Neural Networks and Fuzzy Systems 3-0-2 (4)
Material & Metallurgy	Nano-Technology and Surface Engineering 3-0-2 (4)	Aerospace Materials 3-0-2 (4)
Robotics	Robot Operating Systems 3-0-2 (4)	Cognitive Robotics 3-0-2 (4)
Electric Vehicles	Modelling and Simulation of EHV 3-0-2 (4)	Autonomous Vehicles 3-0-2 (4)

Exit Point

Degree in Mechanical Engineering with specialization in_____.

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