



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA  
VIZIANAGARAM-535 003, A.P  
(Established by Andhra Pradesh Act No.22 of 2021)

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# **B. Tech (Regular-Full time)**

**(Mechanical Engineering)**



**B.TECH. - COURSE STRUCTURE – R23**  
**(Applicable from the academic year 2023-24 onwards)**

**INDUCTION PROGRAMME**

<b>S.No.</b>	<b>Course Name</b>	<b>Category</b>	<b>L-T-P-C</b>
1	Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2	Career Counseling	MC	2-0-2-0
3	Orientation to all branches -- career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0



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B.TECH- Mechanical

I Year I Semester						
S.No .	Course Code	Course Name	L	T	P	Credits
1.	R23BS01	Linear Algebra & Calculus	3	0	0	3
2.	R23BS04	Engineering Chemistry	3	0	0	3
3.	R23ES07	Introduction to Programming	3	0	0	3
4.	R23ES03	Engineering Graphics	1	0	4	3
5.	R23ES04	Basic Electrical & Electronics Engineering	3	0	0	3
6.	R23BS04	Engineering Chemistry Lab	0	0	2	1
7.	R23ES07	Computer Programming Lab	0	0	3	1.5
8.	R23ES05	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9.	R23MC02	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5
		<b>Total</b>				<b>19.5</b>

I Year II Semester						
S.No .	Course Code	Course Name	L	T	P	Credits
1.	R23BS02	Differential Equations and Vector Calculus	3	0	0	3
2.	R23BS03	Engineering Physics	3	0	0	3
3.	R23HS01	Communicative English	2	0	0	2
4.	R23ES01	Basic Civil & Mechanical Engineering	3	0	0	3
5.	R23PC01	Engineering Mechanics	3	0	0	3
6.	R23HS01	Communicative English Lab	0	0	2	1
7.	R23BS03	Engineering Physics Lab	0	0	2	1
8.	R23ES06	IT workshop	0	0	2	1
9.	R23ES02	Engineering Workshop	0	0	3	1.5
10.	R23PC01	Engineering Mechanics Lab	0	0	3	1.5
11.	R23MC01	Health and Wellness, Yoga and Sports	0	0	1	0.5
		<b>Total</b>				<b>20.5</b>

## B.Tech.– II Year I Semester

S.No.	Category	Title	L	T	P	Credits
1	BS	Numerical & Statistical methods	3	0	0	3
2	HSMC	Universal Human Values– Understanding Harmony & Ethical human conduct	2	1	0	3
3	ES	Thermodynamics	2	0	0	2
4	PCC	Mechanics of Solids	3	0	0	3
5	PCC	Material Science and Metallurgy	3	0	0	3
6	PCC	Mechanics of Solids and Materials Science Lab	0	0	3	1.5
7	PCC	Computer-aided Machine Drawing	0	0	3	1.5
8	ES	Python programming Lab	0	0	2	1.0
9	SEC	Embedded Systems and IoT	0	1	2	2
10	Audit Course	Environmental Science	2	0	0	-
<b>Total</b>			<b>15</b>	<b>2</b>	<b>10</b>	<b>20</b>

**B.Tech.– II Year II Semester**

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**B.Tech. – III Year I Semester**

**B.Tech. – III Year I Semester**

S.No.	Category	Title	L	T	P	Credits
1	PC	Machine Tools and Metrology	3	0	0	3
2	PC	Thermal Engineering	3	0	0	3
3	PC	Theory of Machines	3	1	0	3
4	PCE-1	Professional Elective – I	3	0	0	3
5	OE-1	1. Sustainable Energy Technologies 2. Applied operation Research 3. Industrial safety 4. Energy Conservation Management	3	0	0	3
6	PC Lab-1	Thermal Engineering Lab	0	0	3	1.5
7	PC Lab-2	Theory of Machines Lab	0	0	3	1.5
8	SEC	Machine Tools & Metrology Lab Mechatronics Lab	0	0	4	2
9	ES	Computational Fluid Dynamics Lab	0	0	2	1.0
10	Evaluation of Community Service Internship	Community Service Internship	-	-	-	2
Total			15	0	12	<b>23</b>

**Professional Elective - I**

1. Instrumentation & Control Systems
2. Nano Technology
3. Design for manufacturing
4. Thermal management of Electronic Systems
5. Joining Processes



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**B.Tech. – III Year II Semester**

**B.Tech. III Year II Semester**

S.No.	Category	Title	L	T	P	Credits
1	PC	Heat Transfer	3	0	0	3
2	PC	Artificial Intelligence and Machine Learning	3	0	0	3
3	PC	Finite Element Methods	3	0	0	3
4	PE - II	Professional Elective-II	3	0	0	3
5	PE - III	Professional Elective-III	3	0	0	3
6	OE - II	1. Electrical vehicles 2. Supply chain management 3. Design of Experiments 4. Total Quality Management 5. Industrial robotics	3	0	0	3
7	PC Lab-1	Heat Transfer Lab	0	0	3	1.5
8	PC Lab-2	Artificial Intelligence and Machine Learning Lab	0	0	3	1.5
9	SEC	Computer Aided Manufacturing Lab Robotics and Drone Technology	0	1	2	2
10	Audit Course	Technical paper writing and IPR	2	0	0	-
<b>Total</b>			<b>20</b>	<b>01</b>	<b>08</b>	<b>23</b>
Mandatory Industry Internship of 08 weeks duration during summer vacation						

**Professional Elective-II**

1. Industrial robotics
2. Supply chain management
3. Additive manufacturing
4. UnConventional Machining Processes
5. Refrigeration and Air conditioning

**Professional Elective-III**

1. Automobile Engineering
2. Computer Integrated Manufacturing
3. Smart manufacturing
4. Mechanical Vibrations
5. Composite materials



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**B.Tech. – IV Year I Semester**

S.No.	Category	Title	L	T	P	Credits
1	PC	CAD/CAM	3	0	0	3
2	Management Course- II	Operations Research	2	0	0	2
3	PE – IV	Professional Elective-IV	3	0	0	3
4	PE - V	Professional Elective-V	3	0	0	3
5	OE - III	1. Digital marketing management 2. Product design and development 3. Introduction to Mechatronics 4. Condition Monitoring 5. Operations Management	3	0	0	3
6	OE - IV	1. Statistical Quality Control 2. Nano Materials 3. Entrepreneurship 4. Product Design & Development 5. Optimization Techniques	3	0	0	3
7	Skill Enhancement Course	Renewable Energy Simulation Lab Instrumentation and control systems lab	0	1	2	2
8	Audit Course	Constitution of India	2	0	0	-
9	Internship	Evaluation of Industry Internship	-	-	-	2
<b>Total</b>			<b>19</b>	<b>01</b>	<b>02</b>	<b>21</b>

Professional Elective-IV

1. Production Planning & Control
2. Nondestructive evaluation
3. Smart materials
4. Hydrogen and fuel cell technology
5. Power Plant Engineering

Professional Elective-V

1. Electric and Hybrid vehicles
2. Cryogenics
3. Automation in Manufacturing
4. Industrial Hydraulics and Pneumatics
5. Noise Control



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**B.Tech. – IV Year II Semester**

S.No	Category	Title	L	T	P	C
1	Internship & Project Work	Full semester Internship & Project Work	0	0	24	12

**For Minor degree: (18 Credits)**

1. Industrial Engineering and Management
2. Materials Science
3. Design of Machine Elements
4. Manufacturing Technologies
5. Basics of Thermal Engineering
6. Material Science Lab
7. Manufacturing Technologies Lab

**For Honor's degree:**

**1. Machine Design (18 Credits)**

1. Advanced Mechanics of Solids
2. Advanced Finite Element Methods
3. Advanced Mechanisms & Robotics
4. Advanced Machine Design
5. Design for Manufacturing & Assembly
6. Computational Lab
7. Mechanisms and Robotics Lab

**2. CAD/CAM (18 Credits)**

1. Advanced CAD
2. Computer Integrated Manufacturing
3. Modeling & Simulation of Manufacturing systems
4. Advanced Manufacturing Processes
5. Quality & Reliability
6. Advanced CAD Lab
7. Modeling & Simulation of Manufacturing systems Lab





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**3. Thermal Engineering (18 Credits)**

1. Advanced Thermodynamics
2. Advanced Fluid Mechanics
3. Advanced Heat Transfer
4. Advanced CFD
5. Design of Heat Transfer Equipment
6. Computational laboratory
7. Computational Fluid Dynamics Lab

**4. Robotics and Automation (18 Credits)**

- 1) Robotic Engineering
- 2) Basic Control system for robots
- 3) Fluid Power System for Automation
- 4) Industrial IoT and Cloud Computing
- 5) Autonomous Navigation and Path Planning
- 6) Robot Design Lab
- 7) IoT and Cloud Computing Lab

**5. Industrial Engineering (18 Credits)**

- 1) Operations Planning and Control
- 2) Work System Design
- 3) Facilities Planning
- 4) Advanced Operation Research
- 5) Productivity Engineering & Management
- 6) Industrial Engineering Lab-I
- 7) Industrial Engineering Lab-II