SIPNA COLLEGE OF ENGINEERING & TECHNOLOGY, AMRAVATI

An Autonomous Institute Affiliated to

Sant Gadge Baba Amravati University, Amravati, Maharashtra (India)

(Approved by AICTE, New Delhi and Recognized by DTE, Maharashtra)

(Accredited With 'A+' Grade by NAAC)

Bachelor of Technology (B. Tech.)

Programme Scheme of Examination (SoE) and Syllabus

Department of Mechanical Engineering

B. Tech. Mechanical Engineering with Multidisciplinary Minor

(Semester Pattern)

Effective from Academic Year 2024-25

Prepared by: Board of Studies - Mechanical Engineering

Approved by: Academic Council - Sipna COET, Amravati

			31/08/2024	1.00
Chairman Board of Studies	**Dean Academics**	**Chairman Academic Council**	**Date of Release**	**Version**

Index

APPROVED in.....1st.....
Academic Council Meeting
Dated:-.....31/08/2024.....

About the Department:

Mechanical Engineering Department was established in 2015. Our Bachelor of Mechanical Engineering program is designed to give you the skills you need to solve real-world problems. This course equips you with the skills to succeed in a changing business, and you'll benefit from the research-led culture. A team of 13 well qualified and experienced faculty members is the backbone of the department. Department has well equipped laboratories and state of the art facilities. The CAD/CAM center is equipped with high configuration machines, a CNC trainer machine and a Robotic arm. Department also has a Research Center recognized by SGBAU, Amravati for doctoral research. Ours is one of the youngest departments in the region to get accredited by NBA. A post graduate program in Computer Integrated Manufacturing is introduced from session 2024-25 with an intake capacity of 18 seats.

Institute Vision

To Provide Quality Professional Education and Conducive Environment to Emerge as a model Proficient Institute

Institute Mission

- To Create Scholarly and Vibrant Environment for Professional Excellence.
- To Contribute to Advancement of Knowledge in Basic and Applied Areas of Engineering and Technology.
- To be an Institute of Choice in the Region by Developing, Managing, and Transferring Contemporary Technologies.
- To Build Mutually Valuable Terms with Society, Industry, and Alumni.

Department Vision

The Department of Mechanical Engineering is Committed to Produce Competent Engineering Graduates Through Quality Teaching Learning Process, Research, and Industry Institute Interaction so as to Shoulder the Responsibilities of Nation Building.

Department Mission

- To Develop Conducive Teaching Learning Environment for Benefit of the Students.
- To Develop Mutually Beneficial Relationship with Industries and understand the Needs of Industry.
- To Promote the Faculty & Students to Actively Participate in Research Activities.
- To Educate Students about Professional & Ethical Responsibilities and train them to inculcate Leadership and Entrepreneurship Qualities for their Career Development.

APPROVED in... 1st ...
Academic Council Meeting
Dated:- 31/08/2024

Key Features of Curriculum

1. Provision for Open Electives Courses (OEC), Vocational and Skill Enhancement Courses (VSEC), Ability Enhancement Courses (AEC), IndianKnowledge System (IKS), Value Education Courses (VEC), Basic Science Courses (BSC), Engineering Science Courses (ESC), Co-curricular Courses (CC) in addition to program core courses.
2. Mandatory internship of one semester (06 Months)
3. Credits for Value education Courses, Ability Enhancement Courses, Co-curricular and Extra Curricular Activities.
4. Interdisciplinary and multidisciplinary education through single minor, double minors and open electives.
5. Provision for learning courses in online mode through Swayam / MOOCS / NPTEL etc.
6. Provision for B. Tech. degree with Honors/ Double Minors.
7. Opportunity for learners to choose courses of their interest in all disciplines.
8. Provision of Field Project.
9. Multiple Entry and Exit option after every year.

Programme Outcomes (POs): Engineering Graduates will be able to:

PO1: Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: 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.

PO3: 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.

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 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.

APPROVED in..... Academic Council Meeting
Dated:-...31/08/2024.....

PO6: 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.

PO7: 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.

PO8: Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and teamwork:

Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary 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 multi-disciplinary environments.

PO12: 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.

Program Education Objectives (PEOs):

PEO1:

Mechanical Engineering Graduate will be able to apply the fundamental knowledge of Basic Sciences, Thermal, Design and Manufacturing Technologies.

PEO2:

Mechanical Engineering Graduate will develop ability to Interpret and Analyze data, Formulate and Design acceptable solutions to industrial problems.

PEO3:

Mechanical Engineering Graduate will effectively function in a Team Environment with Ethical Attitude and interact with people of diverse background.

PEO4:

Mechanical Engineering Graduate will Secure Jobs or pursue Higher Studies and engage in continuous upgradation of their Professional Skills.

APPROVED in ..... Academic Council Meeting Dated:- 31/08/2024

Programme Specific Outcomes (PSOs):

Engineering Graduates will be able to:

PSO1:

Plan, Organize and Execute the day-to-day activities in production and service industries.

PSO2:

Take part in activities like product design and development, material selection and analysis using modern software tools.

PSO3:

Identify, Formulate, Analyze and provide technological solutions to real life problems in the field of Thermal Engineering.

PSO4:

Demonstrate Administrative and Managerial skills to work effectively in a team and society by following ethical and environmental practice.

General Course Structure

A. Definition of Credit

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
2 Hours Practical (P) per week	1Credit

B. Total Credits for the completion of B.Tech. in Mechanical Engineering:

The total number of credits proposed for the four year B. Tech. in Mechanical Engineering with one Multidisciplinary Minor (Compulsory) degree is **172** as per the structure given below:

Students can opt for any of the following as per the rules and regulations given by the institute:

1. B. Tech. Mechanical Engineering with Multidisciplinary Minor = Total 172 Credits
2. B. Tech. Mechanical Engineering with Multidisciplinary Minor and Honors Specialization = Total 190 Credits
3. B. Tech. Mechanical Engineering with Multidisciplinary Minor and Honors with Research = Total 190 Credits
4. B. Tech. Mechanical Engineering with Multidisciplinary Minor and Specialization Minor (Double Minors) = Total 192 credits

APPROVED in 1st Academic Council Meeting Dated:- 31/08/2024

C. Semester Wise Credit Distribution Structure for Four Year UG Program with One Multidisciplinary Minor

Courses		No of Credits/Semester								Total Credit	% Credit Allotment
		1	2	3	4	5	6	7	8		
Basic Science Course	BSC/ESC	7	7	3	--	--	--	--	--	17	9.88
Engineering Science Course		7	9		--	--	--	--	--	16	9.30
Programme Core Course (PCC)	Program Courses	--	2	12	13	12	8	11	--	58	33.72
Programme Elective Course (PEC)		--	--	--	--	4	8	7	--	19	11.04
Multidisciplinary Minor (MDM)	Multidisciplinary Courses	--	--	3	3	3	3	--	2	14	8.13
Open Elective (OE) Other than a particular program		--	--	2	2	2	--	--	--	6	3.50
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	2	1	--	2	--	2	--	--	7	4.06
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	2	--	--	--	--	1	--	--	3	6.97
Entrepreneurship/Economics/ Management Courses		--	--	2	2	--	--	--	--	4	
Indian Knowledge System (IKS)		--	2	--	--	--	--	--	--	2	
Value Education Course (VEC)		3	--	--	--	--	--	--	--	3	
Research Methodology	Experiential Learning Courses	--	--	--	--	--	--	--	4	4	12.20
Comm. Engineering Project (CEP)/Field Project (FP)		--	--	--	--	1	--	--	--	1	
Project		--	--	--	--	--	--	4	--	4	
Internship/ OJT		--	--	--	--	--	--	--	12	12	
Co-curricular Courses (CC)	Liberal Learning Courses	1	1	--	--	--	--	--	--	2	1.16
Total Credits		**22**	**22**	**22**	**22**	**22**	**22**	**22**	**18**	**172**	**100%**

APPROVED in.....1st.....
Academic Council Meeting
Dated:-.....31/08/2024.....

1. Vocational and Skill Enhancement Courses (VSEC):07 Credits

VSEC Courses including hands on training corresponding to the Major and/or Minor Subject. Vocational courses include skill based advanced laboratory practical of Major Programme.

The following courses are offered as Vocational and Skill Enhancement courses by the department of Mechanical Engineering.

Sr. No.	Course Title	Semester	Credits
1	Workshop Practice	I	1
2	Design Thinking	I	1
3	Fundamental of Computer Graphics	II	1
4	Machine Drawing	IV	2
5	CAD & Simulation	VI	2
Total Credits			**07**

2. Humanities, Social Science & Management Courses [HSSMC]:12Credits

The following courses are offered as Humanities, Social Science& Management Courses by Mechanical Engineering Department.

Sr. No.	Category	Course Title	Semester	Credits
1	Value Education Course (VEC-II)	Values and Ethics	I	2
2	Value Education Course (VEC-I)	Environmental Studies	I	1
3	Ability Enhancement Course (AEC-I)	Professional Communication	I	2
4	Indian Knowledge System (IKS)	Indian Knowledge System	II	2
5	Entrepreneurship/Economics/ Management Courses	Industrial Management	III	2
6	Entrepreneurship/Economics/ Management Courses	Mechanical Estimation & Costing	IV	2
7	Ability Enhancement Course (AEC-II)	Modern Indian Language	VI	1
		Total Credits		**12**

APPROVED in... 1st ...
Academic Council Meeting
Dated:- 31/08/2024

3. **Multidisciplinary Minor Courses:14 Credits**

i. Compulsory Multidisciplinary Minor courses are offered from the different disciplines of Engineering.

ii. Students once registered for the selected course of Multidisciplinary Minors(MDM) in 3rd semester need to complete all credits assigned from 3rd to 8th semester for that specific selected MDM course only.

Offering Department	Eligible students	Track	MDM-I 3rd Semester	MDM-II 4th Semester	MDM-III 5th Semester	MDM-IV 6th Semester	MDM-V 8th Semester
Computer Science & Engineering	IT/AD	Cyber Security and Cryptography	Web Security and Mobile Security	Risk Analysis and Assessment	Secure Communication and Cryptography	Secure Coding and Vulnerabilities	Term Work
	ET/ME/ CE	Fundamentals of Computing and Software Systems	Data Structure	Operating System	Database Management System	System Analysis and Software Testing	Term Work
Information Technology	AD/CS	Cloud Computing	Cloud Infrastructure	Cloud Platform	Cloud Application Development	Cloud Security and Compliance	Term Work
	CE/ET/ ME	Fundamentals of Computing & Software Systems	Data Structure	Operating System	Database Management System	System Analysis and Software Testing	Term Work
Electronics and Tele-communicatio n Engineering	AD/CE/CS /IT/ME	Mobile and wireless Communication	Basic Digital Communication	Data & Wireless Communications	Mobile Computing	5G & 6G Communication s	Term Work
	AD/CE/CS /IT/ME	IOT & Embedded Systems	Microcontroller & Embedded C Programming	Sensors & Actuators in Embedded Systems	Real Time Embedded Systems	IOT & Applications	Term Work
Civil Engineering	AD/CS/ET /IT/ME	Construction Technology	Fundamentals of Civil Engineering	Building Construction & Planning	Water Supply Engineering	Transportation Engineering	Term Work
	AD/CS/ET /IT/ME	Transportation Engineering	Highway Engineering	Railways & Airport Engineering	Bridges & Tunnel Engineering	Intelligent Transportation System	Term Work
Mechanical Engineering	AD/CS/ET /IT/CE	Manufacturing Technologies	Manufacturing Processes	Advance Manufacturing Processes	Metrology & Quality Control	Productivity Techniques	Term Work
	AD/CS/ET /IT/CE	Energy Management	Photovoltaic Energy System	Energy Management	Energy Efficiency of Thermal Utility	Sustainable Energy Conversion System	Term Work

APPROVED in 1st Academic Council Meeting
Dated:- 31/08/2024

4. Open Elective Courses: 06 Credits

The open elective subjects offered from the faculty other than Engineering and Technology.

Sr. No.	Open Elective-I Semester III	Faculty	Open Elective-II IV Semester	Faculty	Open Elective-III V Semester	Faculty
1	Digital Marketing	Management and Finance	International Human Rights System	Law	Advanced R Programming for data Analytics in Business	Management Finance
2	Organization Behavior and Psychology	Psychology	Numerical Methods and operational research Techniques	Management	Introduction to stock market and data analysis	Finance
3	Soft Skills and Presentation Skills	Management	Cyber Law	Law	Intellectual Property Rights	Management
4	Industry 4.0	Management	Operations Research	Management	Product Design in Startup & Innovation	Management
5	E - Waste Management	Commerce	Non-Conventional Energy Sources	Humanities Science	Application of Drone Technology in Agriculture	Agriculture
6	Aptitude & Reasoning	Humanities Science	Consumer electronics	Commerce	Customer Relation Management	commerce
7	Green Building Design	Science	Industrial Pollution, Monitoring & Management	Environmental Science	Physical Environment & Natural Resources	Science
8	Architectural Graphics	Architecture	Air and Noise Pollution Control	Environmental Science	Environmental Policies and Governance	Science
9	Introduction to History of Indian Architecture	Architecture	Disaster Management	Environmental Science	Geology	Science
10	Industrial Safety	Health & Safety	Ergonomics	Health & Safety	Total Quality Management	Management
11	Quantitative Aptitude **(For CS, IT only)**	Science	Industrial Costing	Commerce	---	--
12	--	--	Quantitative Aptitude**(For ET,CE,ME,AD only)**	Science	---	--

5. Honors/Double Minors Degree Programmes: 18 Credits

A student shall be eligible for the award of B. Tech. degree with Honors / Double Minors if he/she earns 18 credits in addition to the 172credits of regular B. Tech. Programme within 4 years duration. It is not mandatory for any student to opt for the Honors / Double Minors Program.

The following Honors / Double Minors programmes are approved by Academic Council, Sipna COET from the Academic Session 2024-25.

APPROVED in..... 1st .....
Academic Council Meeting
Dated:-...31/08/2024.....

Honors/Double Minors Degree Programmes

Offering Department	Eligible Students	Honors / Double Minors Degree Programme	3rd Semester	4th Semester	5th Semester	6th semester	7th Semester
Computer Science and Engineering	Honors: AD/CS/IT/ET Minors: CE/ME	Artificial Intelligence & Machine Learning	Artificial Intelligence	Expert System Design	Machine Learning	Deep Learning	Term Work
Information Technology	Honors: AD/CS/IT/ET Minors: CE/ME	Data Science	Foundations of Data Science	Statistics for Data Science	Data Science for Health and Social care	Text, Web and Social media analytics	Term Work
Electronics and Tele-communication Engineering	Honors: ET Minors: ME/ AD/CS/IT/CE	Semiconductor Technologies	Devices and CMOS Technology	Introduction to VLSI design	Logic Synthesis and Optimization	VLSI Chip design	Term Work
	Honors: ET Minors: ME/ AD/CS/IT/CE	Advance Communication Network	Advance Communication network- 1	Advance Communication network- 2	Cloud Computing	Advance Network Security	Term Work
Civil Engineering	Honors: CE Minors: ME/ AD/CS/IT/ET	Structural Engineering	Numerical Methods for Civil Engineering	Repairs and Rehabilitation of Structures	Plastic Analysis of Structures	Advanced Design of Reinforced Concrete Structures	Term Work
	Honors: CE Minors: ME/ AD/CS/IT/ET	Environmental Engineering	Solid and hazardous waste management	Water and air quality modelling	Industrial wastewater treatment	Rainwater harvesting	Term Work
	Honors: CE Minors: ME/ AD/CS/IT/ET	Geotechnical & Transportation Engineering	Bridge Engineering, Docks and Harbours	Traffic Engineering and Management	Water Retaining Structure	Geosynthetics	Term Work
	Honors: CE	Civil Engineering	Structural Dynamics	Advance Soil Mechanics	Urban Transportation Planning	Air and Noise Pollution Control Engineering	Term Work
Mechanical Engineering	Honors: ME Minors: CE/ AD/CS/IT/ET	Advance Thermal Engineering	Applied Thermodynamics	Fluid Dynamics	Heat Transfer & Heat Exchanger Design	Advance R&AC	Term Work
	Honors: ME/ET Minors: CE/ AD/CS/IT	Robotics & Automation	Principles of Robotics	Robot Programming and Simulation	Industrial Automation	Artificial Intelligence in Robotics	Term Work
	Honors: ME Minors: CE/ AD/CS/IT/ET	Additive Manufacturing	Fundamentals of Additive Manufacturing	Design for Additive Manufacturing	3D printing	Metal Additive Manufacturing	Term Work
	Honors: ME/ET Minors: CE/ AD/CS/IT	Electric Vehicle	Basics of Automobile & EV	Battery Management & Fuel Cell Technologies	Hybrid & Autonomous Vehicle	Charging Infrastructure	Term Work
	Honors: ME Minors: CE/ AD/CS/IT/ET	Business Development Marketing & Finance	Business Environment	Business Law & Ethics	Marketing Management & Analytics	Industrial Finance & Costing	Term Work
	Honors: ME Minors: CE/ AD/CS/IT/ET	Logistic Management	Inventory Management	Demand Planning & Forecasting	Supply Chain Management	Logistic Operations	Term Work

APPROVED in 1st Academic Council Meeting
Dated:- 31/08/2024

Honors/Double Minor Degree Programmes applicable to students at Institute Level							
Offering Department	**Name of the Programme**	**Computer Science and Engineering**	**Information Technology**	**Electronics & Telecommunication Engineering**	**Civil Engineering**	**Mechanical Engineering**	**Artificial Intelligence and Data Science**
Computer Science and Engineering	Artificial Intelligence & Machine Learning Cyber Security	Honor	Honor	Honor	Minor	Minor	Honor
Information Technology	Data Science	Honor	Honor	Honor	Minor	Minor	Honor
Electronics and Tele-communication Engineering	Semiconductor Technologies	Minor	Minor	Honor	Minor	Minor	Minor
Electronics and Tele-communication Engineering	Advance Communication Network	Minor	Minor	Honor	Minor	Minor	Minor
Civil Engineering	Structural Engineering	Minor	Minor	Minor	Honor	Minor	Minor
Civil Engineering	Environmental Engineering	Minor	Minor	Minor	Honor	Minor	Minor
Civil Engineering	Geotechnical & Transportation Engineering	Minor	Minor	Minor	Honor	Minor	Minor
Civil Engineering	Civil Engineering	Minor	Minor	Minor	Honor	Minor	Minor
Mechanical Engineering	Advance Thermal Engineering	Minor	Minor	Minor	Minor	Honor	Minor
Mechanical Engineering	Robotics & Automation	Minor	Minor	Honor	Minor	Honor	Minor
Mechanical Engineering	Additive Manufacturing	Minor	Minor	Minor	Minor	Honor	Minor
Mechanical Engineering	Electric Vehicle	Minor	Minor	Honor	Minor	Honor	Minor
Mechanical Engineering	Business Development Marketing & Finance	Minor	Minor	Minor	Minor	Honor	Minor
Mechanical Engineering	Logistic Management	Minor	Minor	Minor	Minor	Honor	Minor

- **For Honors/Double Minors degree programmes refer syllabus and scheme of examination proposed by the respective department.**
- **The guidelines related to the Honors/Minor Certification are provided as separate document: Rules and Regulations of Honors and Minors.**

APPROVED in 1st Academic Council Meeting
Dated:- 31/08/2024

Scheme Semester - I

Scheme for First Year B. Tech. In Mechanical Engineering (Semester -I)															
Sr. No.	Course Name	Course Code	Course Plan per Week (Hrs)				Credits	Theory Evaluation				Practical Evaluation		Total	ESE Time (Hrs)
			L	P	T	Hrs		MSE-I	MSE- II	TA	ESE	INT	EXT		
Basic Science Courses (BSC)															
1	Engineering Mathematics -I	BTALBS01SH1T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
2	Engineering Chemistry	BTALBS02SH1T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
3	Engineering Chemistry Lab	BTALBS03SH1P	-	2	-	2	1	-	-	-	-	30	20	50	--
Engineering Science Courses (ESC)															
4	Engineering Graphics	BTALES01ME1T	3	-	-	3	3	15	15	10	60	-	-	100	3.0
5	Engineering Graphics Lab	BTALES02ME1P	-	2	-	2	1	-	-	-	-	30	20	50	--
6	Engineering Mechanics	BTMEES03CE1T	2	-	-	2	2	15	15	10	60	-	-	100	2.5
7	Engineering Mechanics Lab.	BTMEES04CE1P	-	2	-	2	1	-	-	-	-	30	20	50	--
Vocational and Skill Enhancement Courses (VSEC)															
8	Workshop Practice Lab.	BTMEVS01ME1P	-	2	-	2	1	-	-	-	-	30	20	50	--
9	Design Thinking	BTMEVS02ME1T	1	-	-	1	1	-	-	50	-	-	-	50	--
Ability Enhancement Courses (AEC)															
10	Professional Communication	BTALAE01SH1P	-	2	1	3	2	-	-	-	-	30	20	50	--
Value Education Courses (VEC)															
12	Values & Ethics	BTALVE01SH1T	2	-	-	2	2	15	15	10	60	-	-	100	2.5
12	Environmental Studies	BTALVE02SH1T	1	-	-	1	1	-	-	50	-	-	-	50	--
Co-curricular Courses (CC)															
13	Co-curricular course (CC1)	-----	-	2	-	2	1	-	-	50	-	-	-	50	--
	TOTAL		**15**	**12**	**1**	**28**	**22**	**75**	**75**	**200**	**300**	**150**	**100**	**900**	--

L:Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External

List of Co-Curricular Courses (CC1) Semester– I (Choose any one course)

Sr. No.	Course Code Sem. I	Co-curricular Courses	Course Code Sem. II	Sr. No.	Course Code Sem. I	Co-curricular Courses	Course Code Sem. II
1	BTALCC01SH1P	Music Vocal - I	BTALCC01SH2P	8	BTALCC15SH1P	Human psychology - I	BTALCC15SH2P
2	BTALCC03SH1P	Music Instrumental (Guitar) - I	BTALCC03SH2P	9	BTALCC17SH1P	Drama/ Theater Activity - I	BTALCC17SH2P
3	BTALCC05SH1P	Dance - I	BTALCC05SH2P	10	BTALCC19SH1P	Mindfulness Meditation Program - I	BTALCC19SH2P
4	BTALCC07SH1P	Basketball - I	BTALCC07SH2P	11	BTALCC21SH1P	NSS - I	BTALCC21SH2P
5	BTALCC09SH1P	Cricket - I	BTALCC09SH2P	12	BTALCC23SH1P	Yoga -I	BTALCC23SH2P
6	BTALCC11SH1P	Volleyball - I	BTALCC11SH2P	13	BTALCC25SH1P	Film Making - I	BTALCC25SH2P
7	BTALCC13SH1P	Language Sanskrit - I	BTALCC13SH2P	--	--	--	--

Note: Six hours per week are allotted for continuous evaluation process of the above subjects(Total contact hours per week=34 Hrs).

APPROVED in 1st Academic Council Meeting Dated:- 31/08/2024

Scheme Semester – II

Scheme for First Year B. Tech. In Mechanical Engineering (Semester -II)

Sr. No.	Course Name	Course Code	Course Plan per Week (Hrs)				Credits	Theory Evaluation				Practical Evaluation		Total	ESE Time (Hrs)
			L	P	T	Hrs		MSE-I	MSE- II	TA	ESE	INT	EXT		
Basic Science Courses (BSC)															
1	Applied Mathematics -II	BTALBS04SH2T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
2	Engineering Physics	BTMEBS05SH2T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
3	Engineering Physics Lab	BTMEBS06SH2P	0	2	0	2	1	-	-	-	-	30	20	50	--
Engineering Science Courses (ESC)															
4	Basic Electrical Engineering	BTALES05ET2T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
5	Basic Electrical Engineering Lab	BTALES06ET2P	0	2	0	2	1	-	-	-	-	30	20	50	--
6	Programming for Problem Solving	BTMEES07IT2T	3	0	0	3	3	15	15	10	60	-	-	100	2.5
7	Programming for Problem Solving Lab	BTMEES08IT2P	0	2	0	2	1	-	-	-	-	30	20	50	--
8	Mechanical Joining Processes Lab	BTMEES09ME2P	0	2	0	2	1	-	-	-	-	30	20	50	--
Vocational and Skill Enhancement Courses (VSEC)															
9	Fundamentals of Computer Graphics Lab	BTMEVS03ME2P	0	2	0	2	1	-	-	-	-	50	-	50	--
Program Core Courses (PCC)															
10	Mechanical Joining Processes	BTMEPC01ME2T	2	0	0	2	2	15	15	10	60	-	-	100	2.5
Indian Knowledge System (IKS)															
11	Indian Knowledge System	BTALIK01SH2T	2	0	0	2	2	-	-	50	-	-	-	50	--
Co-curricular Courses (CC)															
12	Co-curricular course (CC-2)	-----	0	2	0	2	1	-	-	50	-	-	-	50	--
TOTAL			**16**	**12**	**0**	**28**	**22**	**75**	**75**	**150**	**300**	**170**	**80**	**850**	

L:Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External

List of Co-Curricular Courses (CC2) Semester- II (Choose any one course)

Sr. No.	Course Code Sem. I	Co-curricular Courses	Course Code Sem. II	Sr. No.	Course Code Sem. I	Co-curricular Courses	Course Code Sem. II
1	BTALCC02SH1P	Music Vocal -II	BTALCC02SH2P	8	BTALCC16SH1P	Human psychology -II	BTALCC16SH2P
2	BTALCC04SH1P	Music Instrumental (Guitar)-II	BTALCC04SH2P	9	BTALCC18SH1P	Drama/ Theater Activity -II	BTALCC18SH2P
3	BTALCC06SH1P	Dance-II	BTALCC06SH2P	10	BTALCC20SH1P	Mindfulness Meditation Program - II	BTALCC20SH2P
4	BTALCC08SH1P	Basketball -II	BTALCC08SH2P	11	BTALCC22SH1P	NSS-II	BTALCC22SH2P
5	BTALCC10SH1P	Cricket -II	BTALCC10SH2P	12	BTALCC24SH1P	Yoga -II	BTALCC24SH2P
6	BTALCC12SH1P	Volleyball -II	BTALCC12SH2P	13	BTALCC26SH1P	Film Making - II	BTALCC26SH2P
7	BTALCC14SH1P	Language Sanskrit -II	BTALCC14SH2P	--	--	--	--

Scheme for Multiple Entry and Exit

Exit option 1(L4.5): Award of One Year UG Certificate in Major with 44 credits and an additional 8 credits.		
Exit Courses		**Credits**
1. Welding Technology / Joining Process	Online certification Course	2
2. One Month Internship at Industry	As per the instruction from Department	6

Note: Six hours per week are allotted for continuous evaluation process of above subjects (Total contact hours per week = 34 Hrs).

APPROVED in 1st Academic Council Meeting Dated: 31/08/2024

Scheme Semester – III

Scheme for Second Year B. Tech. In Mechanical Engineering (Semester-III)

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)				Credit	Theory Evaluation				Practical Evaluation		Total	ESE Time Hrs.
			L	P	T	Hrs		MSE-I	MSE-II	TA	ESE	INT	EXT		
Basic Science Courses (BSC)															
1	Applied Mathematics - III	BTMEBS07SH3T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
Program Core Courses (PCC)															
2	Mechanics of Materials	BTMEPC02ME3T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
3	Mechanics of Materials Lab	BTMEPC03ME3P	-	2	-	2	1	-	-	-	-	30	20	50	--
4	Mechanical Shaping & Forming Process	BTMEPC04ME3T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
5	Mechanical Shaping & Forming Processes Lab	BTMEPC05ME3P	-	2	-	2	1	-	-	-	-	30	20	50	--
6	Engineering Thermodynamics	BTMEPC06ME3T	3	-	1	4	4	15	15	10	60	-	-	100	2.5
Multidisciplinary Minor Courses (MDM)															
7	Multidisciplinary Minor- I	-----	3	-	-	3	3	15	15	10	60	-	-	100	2.5
Open Elective Courses (OEC)															
8	Open Elective- I	-----	2	-	-	2	2	15	15	10	60	-	-	100	2.5
Entrepreneurship/ Economics/ Management Course (HSSMC)															
9	Industrial Management	BTMEHM01ME3T	2	-	-	2	2	15	15	10	60	-	-	100	2.5
TOTAL			**19**	**4**	**1**	**24**	**22**	**105**	**105**	**70**	**420**	**60**	**40**	**800**	-

L:Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External

Note-For syllabus and course code of Multidisciplinary Minor – I (Semester – III) refer Departmental MDM document.

List of Open Elective Courses (OE-I) Semester-III (Choose any one course)

Sr. No.	Open Elective – I	Course Code	Faculty	S.N.	Open Elective - I	Course Code	Faculty
1	Digital Marketing	BTALOE01CS3T	Management and Finance	7	Green Building Design	BTALOE07CE3T	Science
2	Organization Behavior & Psychology	BTALOE02CS3T	Psychology	8	Architectural Graphics	BTALOE08CE3T	Architecture
3	Soft Skills & Presentation Skills	BTALOE03IT3T	Management	9	Introduction to History of Indian Architecture	BTALOE09CE3T	Architecture
4	Industry 4.0	BTALOE04IT3T	Management	10	Industrial Safety	BTALOE010ME3T	Health & Safety
5	E-Waste Management	BTALOE05ET3T	commerce	11	Quantitative Aptitude (**For CS, IT only**)	BTCSOE011SH3T BTITOE011SH3T	Science
6	Aptitude & Reasoning	BTALOE06ET3T	Humanities Science	--	----	----	----

Note:For syllabusof Open Elective - I (Semester III) Click Here.

APPROVED in..... Academic Council Meeting Dated:-....31/08/2024.....

Scheme Semester – IV

Scheme for Second Year B. Tech. In Mechanical Engineering (Semester -IV)

Sr. No.	Course Name	Code	Course Plan / Week (Hrs)				Credits	Theory Evaluation				Practical Evaluation		Total	ESE Time Hrs.
			L	P	T	Hrs		MSE-I	MSE-II	TA	ESE	INT	EXT		
	Program Core Courses (PCC)														
1	Material science	BTMEPC07ME4T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
2	Material science Lab	BTMEPC08ME4P	-	2	-	2	1	-	-	-	-	30	20	50	--
3	Energy Conversion	BTMEPC09ME4T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
4	Energy Conversion Lab	BTMEPC10ME4P	-	2	-	2	1	-	-	-	-	30	20	50	--
5	Mechanical Machining Processes	BTMEPC11ME4T	2	-	-	2	2	15	15	10	60	-	-	100	2.5
6	Mechanical Machining Processes Lab	BTMEPC12ME4P	-	2	-	2	1	-	-	-	-	30	20	50	--
7	Automobile Engineering & EV	BTMEPC13ME4T	2	-	-	2	2	15	15	10	60	-	-	100	2.5
	Multidisciplinary Minor Courses (MDM)														
8	Multidisciplinary Minor - II	-----	3	-	-	3	3	15	15	10	60	-	-	100	2.5
	Vocational and Skill Enhancement Courses (VSEC)														
9	Machine Drawing	BTMEVS04ME4P	1	2	-	3	2	-	-	-	-	50	-	50	--
	Open Elective Courses (OEC)														
10	Open Elective- II	-----	2	-	-	2	2	15	15	10	60	-	-	100	2.5
	Entrepreneurship/ Economics/ Management Course (HSSMC)														
11	Mechanical Estimation & Costing	BTMEHM02ME4T	2	-	-	2	2	15	15	10	60	-	-	100	2.5
	TOTAL		**18**	**8**	**-**	**26**	**22**	**105**	**105**	**70**	**420**	**140**	**60**	**900**	**-**

L: Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External

Note-For syllabus and course code of Multidisciplinary Minor – II (Semester – IV) refer Departmental MDM document.

List of Open Elective Courses (OE-II) Semester-IV (Choose any one course)

Sr. No.	Open Elective-II	Course Code	Faculty	S.N	Open Elective-II	Course Code	Faculty
1	International Human Rights System	BTALOE12CS4T	Law	7	Industrial Pollution, Monitoring & Mgmt.	BTALOE18CE4T	Environmental Science
2	Numerical Methods & Operation Research Techniques	BTALOE13CS4T	Management	8	Air and Noise Pollution Control	BTALOE19CE4T	Environmental Science
3	Cyber Law	BTALOE14IT4T	Law	9	Disaster Management	BTALOE20CE4T	Environmental Science
4	Operation Research	BTALOE15IT4T	Management	10	Ergonomics	BTALOE21ME4T	Health & Safety
5	Non-Conventional Energy Sources	BTALOE16ET4T	Humanities 'Science	11	Industrial Costing	BTALOE22ME4T	Commerce
6	Consumer Electronics	BTALOE17ET4T	Commerce	12	Quantitative Aptitude **(For ET, CE, ME, AD only)**	BTETOE23SH4T BTCEOE23SH4T BTMEOE23SH4T BTADOE23SH4T	Science

Note:For syllabusof Open Elective - II (Semester - IV) Click Here.

Scheme for Multiple Entry and Exit

Exit option 2 (L2 – 5.0): Award of Two Years UG Diploma in Major with 88 credits and an additional 8 credits		
Exit Courses		**Credits**
1. Advance certification course on any one of 2nd year PCC.	Online Certification Course	3
2. One Month Internship at Industry	As per the instruction from department	5

APPROVED in 1st Academic Council Meeting Dated 31/08/2024

Scheme Semester – V

Sr. No.	Course Name	Code	Course Plan / Week (Hrs)				Credits	Theory Evaluation				Practical Evaluation		Total	ESE Time (Hrs)
			L	P	T	Hrs		MSE-I	MSE- II	TA	ESE	INT	EXT		
	Scheme for Third Year B. Tech. In Mechanical Engineering (Semester -V)														
	Program Core Courses(PCC) / Program Elective Courses (PEC)														
1	Metrology & Quality Control	BTMEPC14ME5T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
2	Metrology & Quality Control Lab.	BTMEPC15ME5P	-	2	-	2	1	-	-	-	-	30	20	50	--
3	Heat Transfer	BTMEPC16ME5T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
4	Heat Transfer Lab.	BTMEPC17ME5P	-	2	-	2	1	-	-	-	-	30	20	50	--
5	Fluid Mechanics & Hydraulic Machines	BTMEPC18ME5T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
6	Fluid Mechanics & Hydraulic Machines Lab.	BTMEPC19ME5P	-	2	-	2	1	-	-	-	-	30	20	50	--
7	Program Elective - I	----	3	-	1	4	4	15	15	10	60	-	-	100	2.5
8	Comm. Engg. Project/Field project	BTMEFP01ME5P	-	2	-	2	1	-	-	-	-	50	-	50	--
	Multidisciplinary Minor Courses (MDM)														
9	Multidisciplinary Minor - III	-----	3	-	-	3	3	15	15	10	60	-	-	100	2.5
	Open Elective Courses (OEC)														
10	Open Elective- III	-----	2	-	-	2	2	15	15	10	60	-	-	100	2.5
TOTAL			**17**	**8**	**1**	**26**	**22**	**90**	**90**	**60**	**360**	**140**	**60**	**800**	-

L:Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External

Note-For syllabus and course code of Multidisciplinary Minor – III (Semester – V) refer Departmental MDM document.

Programme Elective Courses (PEC-I) Semester-V (Choose any one course)

Sr. No.	Course Name	Course Code
1	Power Plant Engineering (PPE)	BTMEPE01ME5T
2	Advance Manufacturing Techniques (AMT)	BTMEPE02ME5T

List of Open Elective Courses (OE-III) Semester-V (Choose any one course)

Sr. No.	Open Elective-III	Course Code	Faculty	S.N.	Open Elective-III	Course Code	Faculty
1	Advanced R Programming for data Analytics in Business	BTALOE24CS5T	Management Finance	6	Customer Relation Management	BTALOE29ET5T	Commerce
2	Introduction to stock market and data analysis	BTALOE25CS5T	Finance	7	Physical Environment & Natural Resources	BTALOE30CE5T	Science
3	Intellectual Property Rights	BTALOE26IT5T	Management	8	Environmental Policies & Governance	BTALOE31CE5T	Science
4	Product Design in Startup & Innovation	BTALOE27IT5T	Management	9	Geology	BTALOE32CE5T	Science
5	Application of Drone Technology in Agriculture	BTALOE28ET5T	Agriculture	10	Total Quality Management	BTALOE33ME5T	Management

Note: For syllabusof Open Elective - III (Semester - V) Click Here

APPROVED in 1st Academic Council Meeting
Dated:- 31/08/2024

Scheme Semester – VI

Scheme for Third Year B. Tech. In Mechanical Engineering (Semester -VI)																
Sr. No.	Course Name	Code	Course Plan per Week (Hrs)				Credit	Theory Evaluation				Practical Evaluation		Total	ESE Time Hrs.
			L	P	T	Hrs		MSE-I	MSE- II	TA	ESE	INT	EXT		
Program Core Courses(PCC) / Program Elective Courses (PEC)															
1	Design of Machine Elements	BTMEPC20ME6T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
2	Design of Machine Elements lab	BTMEPC21ME6P	-	2	-	2	1	-	-	-	-	30	20	50	--
3	Kinematics & Dynamics of Machines	BTMEPC22ME6T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
4	Kinematics & Dynamics of Machines Lab	BTMEPC23ME6P	-	2	-	2	1	-	-	-	-	30	20	50	--
5	Prof. Elective - II	-----	3	-	-	3	3	15	15	10	60	-	-	100	2.5
6	Prof. Elective – II Lab	-----	-	2	-	2	1	-	-	-	-	30	20	50	--
7	Prof. Elective - III	-----	3	-	-	3	3	15	15	10	60	-	-	100	2.5
8	Prof. Elective – III Lab	-----	-	2	-	2	1	-	-	-	-	30	20	50	--
Ability Enhancement Courses (AEC)															
9	Regional Language	BTALAE02SH6T	1	-	-	1	1	-	-	50	-	-	-	50	2.0
Multidisciplinary Minor Courses (MDM)															
10	Multidisciplinary Minor - IV	-----	3	-	-	3	3	15	15	10	60	-	-	100	2.5
Vocational and Skill Enhancement Courses (VSEC)															
11	CAD & Simulation	BTMEVS05ME6P	1	2	-	3	2	-	-	-	-	50	-	50	2.5
TOTAL			17	10	-	27	22	75	75	100	300	170	80	800	-
L:Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External															

Note-For syllabus and course code of Multidisciplinary Minor – IV (Semester – VI) refer Departmental MDM document.

Programme Elective Courses (PEC-II) Semester-VI (Choose any one course with corresponding lab.)

Sr. No.	Course Name	Course Code
1	Non-conventional Energy System (NCES)	BTMEPE03ME6T
2	Non-conventional Energy System (NCES) Lab	BTMEPE04ME6P
3	Rapid Prototyping (RP)	BTMEPE05ME6T
4	Rapid Prototyping (RP) Lab	BTMEPE06ME6P

Programme Elective Courses (PEC-III) Semester-VI(Choose any one course with corresponding lab.)

Sr. No.	Course Name	Course Code
1	Refrigeration & Air Conditioning (RAC)	BTMEPE07ME6T
2	Refrigeration & Air Conditioning (RAC) Lab	BTMEPE08ME6P
3	Robotics & Industrial Application (RIA)	BTMEPE09ME6T
4	Robotics & Industrial Application (RIA) Lab	BTMEPE10ME6P

Scheme for Multiple Entry and Exit

Exit option 3 (L3 – 5.5): Award of Three Years Bachelor's Degree (B. Voc. Or B.Sc.) in Major with 132 credits and an additional 8 credits		
Exit Courses		Credits
1. Certified course of graphic software OR 2. Advance certified course on 3rd year PCC or PEC.	Online Certification Course	3
1. Certified course of analysis software OR 2. Advance certified course on 3rd year PCC or PEC.	Online certification Course	3
3. One Month Internship at Industry	As per the instruction from Department	2

APPROVED in 1st Academic Council Meeting
Dated:- 31/08/2024

Semester – VII

Scheme for Fourth Year B. Tech. In Mechanical Engineering (Semester -VII)

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)				Credits	Theory Evaluation				Practical Evaluation		Total	ESE Time Hrs.
			L	P	T	Hrs		MSE-I	MSE-II	TA	ESE	INT	EXT		
	Program Core Courses (PCC) / Program Elective Courses (PEC)														
1	Mechatronics	BTMEPC24ME7T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
2	Mechatronics- lab	BTMEPC25ME7P	-	2	-	2	1	-	-	-	-	30	20	50	--
3	Measurement & Control Systems	BTMEPC26ME7T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
4	Measurement & Control Systems La.	BTMEPC27ME7P	-	2	-	2	1	-	-	-	-	30	20	50	--
5	Operation Research Techniques	BTMEPC28ME7T	3	-	-	3	3	15	15	10	60	-	-	100	2.5
6	Program Elective - IV	-----	3	-	-	3	3	15	15	10	60	-	-	100	2.5
7	Program Elective - V	-----	3	-	-	3	3	15	15	10	60	-	-	100	2.5
8	Program Elective – V Lab.	-----	-	2	-	2	1	-	-	-	-	30	20	50	--
9	Project & Seminar / Research Project & Seminar	BTMEPS01ME7P BTMERP01ME7P	-	8	-	8	4	-	-	-	-	30	20	50	--
TOTAL			**15**	**14**	**-**	**29**	**22**	**75**	**75**	**50**	**300**	**120**	**80**	**700**	**--**

L:Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External

Programme Elective Courses (PEC-IV) Semester-VII (Choose any one course)

Sr. No.	Course Name	Course Code
1	Design of Transmission System (DOTS)	BTMEPE11ME7T
2	Productivity Techniques (PT)	BTMEPE12ME7T

Programme Elective Courses (PEC-V) Semester-VII (Choose any one course with corresponding lab.)

Sr. No.	Course Name	Course Code
1	Internal Combustion Engine (ICE)	BTMEPE13ME7T
2	Internal Combustion Engine (ICE) Lab	BTMEPE14ME7P
3	Computer Integrated Manufacturing (CIM)	BTMEPE15ME7T
4	Computer Integrated Manufacturing (CIM) Lab	BTMEPE16ME7P

APPROVED in.....1st.....
Academic Council Meeting
Dated:-.....31/08/2024.....

Semester –VIII

Scheme for Fourth Year B. Tech. In Mechanical Engineering (Semester -VIII)																
Sr. No.	Course Name	Code	Course Plan / Week (Hrs)				Credits	Theory Evaluation				Practical Evaluation		Total	ESE Time Hrs.
			L	P	T	Hrs		MSE- I	MSE- II	TA	ESE	INT	EXT		
Program Core Courses (PCC)															
1	Industry Internship OR Research Internship OR Entrepreneurship	BTMEII01ME8P OR BTMERI01ME8P OR BTMEEI01ME8P	-	24	-	24	12	-	-	-	-	-	100	100	--
2	Research Methodology	BTMERM01ME8T	3	-	1	4	4	15	15	10	60	-	-	100	2.5
Multidisciplinary Minor Courses (MDM)															
3	Multidisciplinary Minor - V	--	-	4	-	4	2	-	-	-	-	50	-	50	--
TOTAL			3	28	1	32	18	15	15	10	60	50	100	250	--

L:Lecture P: Practical T : Tutorial MSE: Mid Semester Exam ESE: End Semester Exam TA: Teacher Assessment INT: Internal EXT: External

Note: 1.For the course code of Multidisciplinary Minor – V (Semester – VIII) refer Departmental MDM document.

2. Suitable number of hours per week are allotted for the continuous evaluation process of all subjects from Semester III to Semester VIII (Total contact hours per week = 34 Hrs).

For the Syllabus of Semester I and Semester II – Click Here

APPROVED in..1st..
Academic Council Meeting
Dated:-..31/08/2024..