

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)






Department of Mechanical Engineering Course Curriculum for Multidisciplinary Minors Effective from Academic Year 2024-25

Prepared by: Board of Studies - Mechanical Engineering

Approved by: Academic Council - Sipna COET, Amravati



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



Preface:

The course multidisciplinary minor is designed for students who are curious, adaptable, and eager to expand beyond the boundaries of their primary field of study. It equips students not only to succeed in their chosen careers but also to become innovators and leaders capable of navigating the complexities of a rapidly evolving global landscape.

In an increasingly complex and interconnected world, the ability to draw from multiple disciplines is not just an asset—it's a necessity. The multidisciplinary minor offered by Department of Mechanical Engineering, Sipna College of Engineering and Technology, Amravati embodies this principle by providing students with a unique opportunity to explore and integrate knowledge across various fields. By bridging the gaps between traditional academic boundaries, this Multi-Disciplinary Minor program equips students with the skills and insights needed to address real-world challenges that do not confine themselves to a single domain. We hope that this program inspires our students to embrace the richness of diverse academic pursuits and empowers them to contribute meaningfully to society by leveraging the strengths of multiple disciplines.

  
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Academic Council Meeting
Dated.....31/08/2024.....



Multidisciplinary Minor Courses (14 Credits) offered by the Institute:

1. The Multidisciplinary Minor Courses are offered by different disciplines of Engineering.
2. The student once registered for the selected track of Multidisciplinary Minor (MDM) in 3rd semester needs to complete all credits assigned from 3rd to 8th semester for the specific selected MDM track only.

Student must choose one eligible track as Multidisciplinary Minors out of the tracks provided below.

| Offering Department | Eligible students | Track | MDM-I 3 rd Semester | MDM-II 4 th Semester | MDM-III 5 th Semester | MDM-IV 6 th Semester | MDM-V 8 th 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-communication Engineering | AD/CE/CS /IT/ME | Mobile and wireless Communication | Basic Digital Communication | Data & Wireless Communications | Mobile Computing | 5G & 6G Communication | 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 |

The following tracks are offered as Multidisciplinary Minors by Department of Mechanical Engineering for students of other discipline.

| Track No. | Multidisciplinary Minors Programme | Page No. |
|-----------|------------------------------------|----------|
| 1 | Manufacturing Technologies (MDM1) | 03 |
| 2 | Energy Management (MDM2) | 04 |



Multidisciplinary Minors (MDM-1): Manufacturing Technologies

- Students of the Department of ET/CS/IT/CE/AD Engineering are only eligible to opt for this MDM.**
- General information about Programme:** The aim of this minor program is to develop adequate academic knowledge and skills in a number of knowledge-based manufacturing technologies that are necessary for graduates to be able to effectively work as a team member in the manufacturing/engineering services enterprises.
- Employability Potential of Programme:** Manufacturing offers ample opportunities for career growth. Advancement can be vertical, such as progressing from an entry-level role to a managerial position, or horizontal, moving into different departments or specialties. Continuous learning, acquiring new skills, and demonstrating exceptional performance are key factors in advancing within the industry.
- Programme Objective:** Manufacturing Technologies program is designed to provide knowledge of current technologies used in industries to enable continuous supply of quality products at competitive price. This knowledge shall be useful for leading team towards continuous improvement.
- Programme Outcome:**
 - Gain sufficient knowledge and skills in manufacturing technologies involved in a discrete product manufacturing/engineering services enterprises.
 - Effectively implement and utilize software towards the automation and computerization of "process engineering" and "design for manufacture" activities in engineering and servicing industries.

Curriculum Structure and Scheme of Examination for Multidisciplinary Minors in Manufacturing Technologies

| Sem. | Course Name | Code | Course Plan per Week (Hrs) | | | | | Theory Evaluation | | | | Practical Evaluation | | Total | ESE Time (Hrs) |
|--------------|---------------------------------|--------------|----------------------------|----------|----------|-----------|-----------|-------------------|-----------|-----------|------------|----------------------|----------|------------|----------------|
| | | | L | P | T | Hrs | Credits | MSEI | MSEII | TA | ESE | INT | EXT | | |
| III | Manufacturing Processes | BTALMD11ME3T | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | - | - | 100 | 2.5 |
| IV | Advance Manufacturing Processes | BTALMD12ME4T | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | - | - | 100 | 2.5 |
| V | Metrology & Quality Control | BTALMD13ME5T | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | - | - | 100 | 2.5 |
| VI | Productivity Techniques | BTALMD14ME6T | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | - | - | 100 | 2.5 |
| VIII | Term Work | BTALMD15ME8P | - | 4 | - | 4 | 2 | - | - | - | - | 50 | - | 50 | - |
| TOTAL | | | 12 | 4 | - | 16 | 14 | 60 | 60 | 40 | 240 | 50 | - | 450 | |

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



Multidisciplinary Minors (MDM-2): Energy Management

- Students of the Department of ET/CE/CS/IT/AD Engineering are only eligible to opt for this MDM.**
- General information about programme:** This program is systematic approach designed to optimize the use of energy within an organization or facility. It aims to reduce energy consumption, lower costs, and minimize environmental impact.
- Employability potential of programme:** The employability potential of a career in energy management is robust and growing, reflecting the increasing importance of energy efficiency and sustainability across various sectors. As businesses and governments worldwide prioritize reducing energy consumption and transitioning to renewable sources, the demand for skilled professionals in energy management continues to rise.
- Programme Objective:** Energy Management program is designed to prepare students to effectively manage and optimize energy use, promote sustainability, and contribute to the development of energy-efficient systems.
- Programme Outcome:** Graduates of the Energy Management program will be well-prepared to enter the workforce with the skills needed to manage energy resources effectively, lead sustainability efforts, and drive innovation in the energy sector.

Curriculum Structure and Scheme of Examination for Multidisciplinary Minors in Energy Management

| Sem. | Course Name | Code | Course Plan per Week (Hrs) | | | | | Theory Evaluation | | | | Practical Evaluation | | Total | ESE Time (Hrs) |
|--------------|--------------------------------------|--------------|----------------------------|----------|----------|-----------|-----------|-------------------|-----------|-----------|------------|----------------------|----------|------------|----------------|
| | | | L | P | T | Hrs | Credits | MSEI | MSEII | TA | ESE | INT | EXT | | |
| III | Photovoltaic Energy System | BTALMD21ME3T | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | - | - | 100 | 2.5 |
| IV | Energy Management | BTALMD22ME4T | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | - | - | 100 | 2.5 |
| V | Energy Efficiency of Thermal Utility | BTALMD23ME5T | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | - | - | 100 | 2.5 |
| VI | Sustainable Energy Conversion System | BTALMD24ME6T | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | - | - | 100 | 2.5 |
| VIII | Term Work | BTALMD25ME8P | - | 4 | - | 4 | 2 | - | - | - | - | 50 | - | 50 | - |
| TOTAL | | | 12 | 4 | - | 16 | 14 | 60 | 60 | 40 | 240 | 50 | - | 450 | - |

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

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