

**माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर (म.प्र.), भारत**  
**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.),**  
**INDIA**

**Deemed University**

**(Declared under Distinct Category by Ministry of Education, Government of India)**

**NAAC ACCREDITED WITH A++ GRADE**



**DEPARTMENT OF CHEMICAL ENGINEERING (CHEM)**

**COURSE STRUCTURE**

*(Tentative)*

| I SEMESTER   | II SEMESTER                                | III SEMESTER                             | IV SEMESTER                                   | V SEMESTER                                | VI SEMESTER                                    | VII SEMESTER                              | VIII SEMESTER   |
|--|--|--|---|---|--|---|---|
| Chemical Process Calculations                        | Organic Process Technology                 | Differential Equations & Vector Calculus | Mass Transfer Operations - II                 | Process Modeling & Simulation             | Transport Phenomena                            | Departmental Elective (DE-3)              | Departmental Elective* (DE-5)                                   |
| Computer Programming                                 | Chemical Engineering Thermodynamics        | Data Structures                          | Instrumentation & Process Control             | Process Equipment Design                  | Artificial Intelligence & Machine Learning     | Departmental Elective* (DE-4)             | Open Category Course* (OC-3)                                    |
| Fluid Mechanics                                      | Heat Transfer Operations                   | Chemical Reaction Engineering – I        | Chemical Reaction Engineering - II            | Data Science                              | Departmental Elective* (DE-2)                  | Open Category Course (OC-2)               | Industry Internship/ Research Internship/ Innovation & Start-up |
| Mechanical Operations                                | Mass Transfer Operations - I               | Mechanical Design of Process Equipment   | Computational Methods in Chemical Engineering | Departmental Elective* (DE-1)             | Open Category Course (OC-1)                    | Specialization Course (SPC-3)             | Professional Development  |
| Basic Electrical & Electronics Engineering           | Linear Algebra & Complex Analysis          | Inorganic Process Technology             | Process Engineering & Costing                 | Specialization Course (SPC-1)             | Specialization Course (SPC-2)                  | Creative Problem Solving                  | <b>Honours or Minor Degree (Optional)</b>                       |
| Computer Programming Lab                             | Fluid Flow & Mechanical Operations Lab     | Heat Transfer Operations Lab             | Mass Transfer Operations Lab                  | Modeling & Simulation Lab                 | Process Computation & Calculations Lab         | <b>Honours or Minor Degree (Optional)</b> |   |
| Electrical & Electronics Engineering Lab             | Problem Solving through Python Programming | Chemical Synthesis Lab                   | Process Control Lab                           | Data Science Lab                          | Artificial Intelligence & Machine Learning Lab |   |   |
| Novel Engaging Course                                | Engineering Physics Lab                    | Novel Engaging Course                    | Reaction Engineering Lab                      | Cornerstone Project                       | Capstone Project                               |   |   |
| Engineering Chemistry Lab                            | Novel Engaging Course                      | Macro Project-I                          | Novel Engaging Course                         | Supply Chain Management                   | Disaster Management                            |   |   |
| Micro Project-I                                      | Micro Project-II                           | Cyber Security                           | Macro Project-II                              | <b>Honours or Minor Degree (Optional)</b> | <b>Honours or Minor Degree (Optional)</b>      |   |   |
| Universal Human Values & Professional Ethics (UHVPE) | Sustainability & Environmental Science     | Skill Internship Program-II              | Project Management, Economics & Financing     |   |  |   |   |
| Skill Internship Program-I                           | Language Lab                               |  | <b>Honours or Minor Degree (Optional)</b>     |   |  |   |   |

  

|  |                             |
|--|-----------------------------|
|  | Departmental Core Courses   |
|  | Basic Science Courses       |
|  | Engineering Science Courses |
|  | Mandatory Audit Courses     |

**Note:**

1. *Mandatory Workshops in each semester at Department Level (Duration: Two Days)*

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| <i>Departmental Elective Courses</i>                                    |  |
|---|--|
| <i>Optimization Techniques</i>  | <i>Equilibrium Staged Operations</i>                   |
| <i>Multi-Component Distillation</i>                                     | <i>Fluidization Engineering</i>                        |
| <i>Multiphase Flow</i>  | <i>Membrane Technology</i>                             |
| <i>Physical and Electrochemical Characterizations in Chemical Engg.</i> | <i>Chemical Process Safety</i>                         |
| <i>Sustainable Energy Technology</i>                                    | <i>Petroleum Reservoir Engineering</i>                 |
| <i>Petroleum Technology</i>   | <i>Chemical Process Intensification</i>                |
| <i>Chemical Plant Utilities</i>   | <i>Biomass Conversion &amp; Biorefinery</i>            |
| <i>Open Category Courses</i>  |  |
| <i>Fuels &amp; Combustion</i>   | <i>Industrial Safety &amp; Hazards</i>                 |
| <i>Environmental Quality Monitoring &amp; Analysis</i>                  | <i>Electrochemical Technology in Pollution Control</i> |
| <i>Multiphase Microfluidics</i>   |  |
| <i>Specialization Courses Tracks</i>                                    |  |
| <b>Specialization in Nanotechnology</b>                                 | <b>Specialization in Pharmaceutical Technology</b>     |
| <i>Nanomaterials &amp; Thin films</i>                                   | <i>Pharmaceutical Formulation Technology</i>           |
| <i>Synthesis &amp; Characterization of Nanomaterials</i>                | <i>Biopharmaceutics &amp; Pharmacokinetics</i>         |
| <i>Micro &amp; Nano Fluidics</i>  | <i>Drug Delivery Technology</i>                        |
| <i>Carbon Nanostructures</i>  | <i>Pharmaceutical Biotechnology</i>                    |
| <b>Specialization in Oil &amp; Natural Gas</b>                          | <b>Specialization in Material Science</b>              |
| <i>Petroleum Exploration &amp; Production Engineering</i>               | <i>Engineering Materials</i>                           |
| <i>Petroleum Processing Technology</i>                                  | <i>Materials Characterization</i>                      |
| <i>Natural Gas Engineering</i>  | <i>Composites &amp; Polymers</i>                       |
| <i>Enhanced Oil Recovery Methods</i>                                    | <i>Biomaterials</i>                                    |