# Scheme of UG Course

## B. Tech. Third Semester (Chemical Engineering)

| Course Number | Subject | Scheme of Studies Periods per week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| MTH24231 | Applied Numerical Methods | 3 | 1 | - | 4 |
| HUM24251 | Fundamental of Entrepreneurship | 3 | - | - | 3 |
| CHE24211 | Chemical Process Calculations | 3 | - | - | 3 |
| CHE24212 | Fluid Mechanics | 3 | - | - | 3 |
| CHE24213 | Chemical Engineering Thermodynamics-1 | 3 | - | - | 3 |
| CHE24214 | Mechanical Operations | 3 | - | - | 3 |
| CHE24215 | Application of AI in Chemical Process Calculations Lab | - | - | 2 | 1 |
| CHE24216 | Fluid Mechanics Lab | - | - | 2 | 1 |
| CHE24217 | Mechanical Operations Lab | - | - | 2 | 1 |
| CHE24218 | Professional Practice | - | 2 | - | 2 |
| **Total Hours = 27** | | **18** | **3** | **6** | **24** |
| **Total Credits (Cumulative)** | | | | | **65** |
| **Additional Subject: National Cadet Corps (NCC)** | | | | | |
| NCC24251 | National Cadet Corps III | **1** | **5** | **1** | **7** |
| **Total Credits (Cumulative)** | | | | | **11** |

## B. Tech. Fourth Semester (Chemical Engineering)

| Course Number | Subject | Scheme of Studies Periods per week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| ME24252 | Fundamentals of Design Methods | 2 | 1 | - | 3 |
| CHE24221 | Heat Transfer | 3 | 1 | - | 4 |
| CHE24222 | Mass Transfer-1 | 3 | - | - | 3 |
| CHE24223 | Chemical Reaction Engineering-1 | 3 | - | - | 3 |
| CHE24224 | Chemical Process Technology | 3 | - | - | 3 |
| CHE24225 | Chemical Engineering Thermodynamics-2 | 3 | - | - | 3 |
| CHE24226 | Heat Transfer Lab | - | - | 2 | 1 |
| CHE24227 | Chemical Process Technology Lab | - | - | 2 | 1 |
| CHE24228 | Project Based Lab-1 | - | - | 2 | 1 |
| **Total Hours = 25** | | **17** | **2** | **6** | **22** |
| **Total Credits (Cumulative)** | | | | | **87** |
| **Additional Subject: National Cadet Corps (NCC)** | | | | | |
| NCC24252 | National Cadet Corps IV | **2** | **-** | **1** | **3** |
| **Total Credits (Cumulative)** | | | | | **14** |

## B. Tech. Fifth Semester (Chemical Engineering)

| Course Number | Subject | Scheme of Studies Periods per week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| ME24351 | Engineering Management | 3 | - | - | 3 |
| CHE24311 | Process Dynamic Models and Control Technology Tools | 3 | 1 | - | 4 |
| CHE24312 | Mass Transfer-2 | 3 | - | - | 3 |
| CHE24313 | Chemical Reaction Engineering-2 | 3 | - | - | 3 |
| CHE24314 | Safety & Hazard Management in Chemical Industries | 3 | - | - | 3 |
| | Departmental Elective-1 (A) | 3 | - | - | 3 |
| CHE24315 | Mass Transfer Lab | - | - | 2 | 1 |
| CHE24316 | Chemical Reaction Engineering Lab | - | - | 2 | 1 |
| CHE24317 | Software Lab | - | - | 2 | 1 |
| CHE24318 | Internship/ Industrial Training | - | - | 2 | 1 |
| **Total Hours = 27** | | **18** | **1** | **8** | **23** |
| **Total Credits (Cumulative)** | | | | | **110** |
| **Additional Subject: National Cadet Corps (NCC)** | | | | | |
| NCC24351 | National Cadet Corps V | **1** | **5** | **1** | **7** |
| **Total Credits (Cumulative)** | | | | | **21** |

## B. Tech. Sixth Semester (Chemical Engineering)

| Course Number | Subject | Scheme of Studies Periods per week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| CS24352 | Data Structure and Algorithm | 3 | 1 | - | 4 |
| CHE24321 | Chemical Process Equipment Design | 3 | 1 | - | 4 |
| CHE24322 | Process Modeling and Simulation | 3 | - | - | 3 |
| CHE24323 | Plant Design and Economics | 3 | - | - | 3 |
| | Department Elective-2 (A) | 3 | - | - | 3 |
| CHE24324 | Process Control & Instrumentation Lab | - | - | 2 | 1 |
| CHE24325 | Process Modeling and Simulation Lab | - | - | 2 | 1 |
| CHE24326 | Process Equipment Design & Drawing Lab | - | - | 2 | 1 |
| CHE24327 | Mini Project | - | - | 2 | 1 |
| **Total Hours = 25** | | **15** | **2** | **8** | **21** |
| **Total Credits (Cumulative)** | | | | | **131** |
| **Additional Subject: National Cadet Corps (NCC)** | | | | | |
| NCC24352 | National Cadet Corps VI | **2** | **-** | **1** | **3** |

| | |
|---|---|
| **Total Credits (Cumulative)** | **24** |

**B. Tech. Seventh Semester (Chemical Engineering)**

| Course Number | Subject | Scheme of Studies Periods per week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| HUM24451 | Engineering Economics & IPR | 3 | - | - | 3 |
| CHE24411 | Transport Phenomena | 3 | - | - | 3 |
| | Department Elective-3 (A) | 3 | - | - | 3 |
| | Department Elective-4 (A) | 3 | - | - | 3 |
| | Open Elective-1(C) | 3 | - | - | 3 |
| CHE24412 | Fuel & Combustion Lab | - | - | 2 | 1 |
| CHE24413 | Project-1 | - | - | 4 | 2 |
| CHE24414 | Internship/Field Training | - | - | 2 | 1 |
| **Total Hours = 23** | | **15** | **-** | **8** | **19** |
| **Total Credits (Cumulative)** | | | | | **150** |

**B. Tech. Eight Semester (Chemical Engineering)**

| Course Number | Subject | Scheme of Studies Periods per week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| | Department Elective-5(A) [NPTEL/SWAYAM Courses only] | 3 | - | - | 3 |
| | Department Elective-6(A) [NPTEL/SWAYAM Courses only] | 3 | - | - | 3 |
| CHE24421 | Project-2 / Internship | - | - | 16 | 8 |
| CHE24422 | General Proficiency | - | - | - | 1 |
| **Total Hours = 22** | | **6** | **-** | **16** | **15** |
| **Cumulative Credits** | | | | | **165** |

**Electives**

**Group A: Departmental Electives**

**Departmental Elective- 1(A)**

CHE24351 Bio Chemical Engineering
CHE24352 Oil and Paint Technology
CHE24353 Sustainable Engineering
CHE24354 Paper and pulp technology
CHE24355 Petroleum Refinery Engineering
CHE24356 Fertilizer Technology
CHE24357 Novel Separation Techniques
CHE24358 Advanced Material Characterization
CHE24359 Bio Energy Technology
CHE24360 Solid Waste Management

**Departmental Elective- 2(A)**

CHE24361 Industrial Pollution Control
CHE24362 Process Piping Design
CHE24363 Packaging Technology
CHE24364 Transport in Porous media
CHE365 Computer Aided Process Control & Design
CHE24366 Fluidization Engineering
CHE24367 Fuels and Combustion
CHE24368 Economics and Managements of Chemical Industries
CHE24369 Advanced Analytical Techniques
CHE24370 Material Synthesis processes

**Departmental Elective- 3(A)**

CHE24451 Air Pollution and control
CHE24452 Oil and Gas well testing and enhanced oil recovery
CHE24453Membrane Science and Technology
CHE24454 Industrial Catalysis
CHE24455 Introduction to Multi Phase Flow
CHE24456 Trends in Healthcare and Technology
CHE24457 Wastewater Treatment
CHE24458 Ceramic Technology
CHE24459Advanced Process Optimization
CHE24460 Introduction to Nano-Science and Technology

**Departmental Elective- 4(A)**

CHE24461 Plant Utility
CHE24462 Numerical and Statistical Methods in Chemical Engineering
CHE24463 Cleaner Technologies in Chemical Process Industries
CHE24464 Computational Fluid Dynamics
CHE24465 Sustainability and Green Chemistry
CHE24466 Nanotechnology in Catalysis
CHE24467 Hazardous Waste Treatment and Management
CHE24468 Rubber Technology
CHE24469 Polymer Science &Technology
CHE24470 Textile Technology
CHE24471 Petrochemical Technology
CHE24472 Statistical analysis and design of experiments in chemical engineering
CHE24473 Electrochemical Engineering

**Group C: Open Elective (Others)**

CE24453 Remote Sensing and GIS
CE24475 Sustainable Development and Global Environmental Issues
CS24456 Web Search and IR
CS24466 Optimization Techniques
ECE24469 Neural Networks
ECE24468 Fuzzy Logic
EE24401 Fundamentals of Electric Drives
EE24402 Power System Protection
ME24581 Value engineering
ME24583 Mechatronics and NDT in engineering
ARC24401 Built and Unbuilt Heritage
ARC24402 Building Indoor and Outdoor Environment
PHY24401 Modern Engineering Physics
PHY24402 Nuclear Power Engineering
PHY24403 Fundamentals of Nanotechnology and Nanoscience
HUM24401 Applied Social Psychology
HUM24402 Basic Econometrics
RE24401 Renewable Energy

**Open Electives offered to Students of Other Departments**

CHE24401 Petroleum Refinery & Petrochemicals
CHE24402 Physico-chemical Separation Processes

# DETAILED SYLLABUS

## B. Tech. 3rd Semester

| | | | |
|---|---|---|---|
| **Name of Program** | B.Tech | Semester-III | |
| **Name of Course** | Applied Numerical Methods | | |
| **Course Code** | MTH24231 | | |
| **Core / Elective / Other** | Core | | |
| **Prerequisite:** | | | |
| **1.** | Knowledge of Engineering Mathematics | | |
| **2.** | Basics of statistical concepts such as central tendencies, dispersion etc. | | |
| **Course Outcomes:** | | | |
| **1.** | Apply suitable numerical techniques for realworld problemsrelated to Chemical Engineering | | |
| **2.** | Have ability of understanding statistical inferences | | |
| **Description of Contents in brief:** | | | |
| **1.** | Numerical Methods: Solution of algebraic and transcendental equations, Solution of linear Simultaneous Equations. | | |
| **2.** | Finite Differences, Interpolation and Extrapolation, Inverse Interpolation. | | |
| **3.** | Numerical Differentiation and Integration. | | |
| **4.** | Numerical solution of Ordinary & Partial Differential Equations. | | |
| **5.** | Statistics: Curve fitting, Correlation and Regression Analysis | | |
| **6.** | Probability Distribution. Sampling and Testing of Hypothesis | | |
| **List of Text Books:** | | | |
| **1.** | Numerical Methods by Dr. B. S. Grewal | | |
| **2.** | Mathematical Statistics-Ray, Sharma and Chaudhary | | |
| **List of Reference Books:** | | | |
| **1.** | Numerical Analysis by Hildebrand, Mcgraw Hill. | | |
| **2.** | Numerical Analysis by Scarborough, Oxford. | | |
| **3.** | Mathematical Statistics – J E Freund & R E Walpole | | |
| **4.** | Numerical Methods by E .Balaguruswamy, TMH | | |
| **URLs:** | | | |
| **1.** | https://nptel.ac.in/courses/111/107/111107105/ | | |
| **2.** | https://nptel.ac.in/courses/111/105/111105041/ | | |
| **3.** | https://nptel.ac.in/courses/111/106/111106101/ | | |
| **4.** | https://nptel.ac.in/courses/110/107/110107114/ | | |