# Course Structure

# of

# B.Tech. in Mechanical Engineering

# Batch: 2024-28


Rajiv Gandhi Institute of Petroleum Technology

(Institution of National Importance) Jais, Amethi-229304, Uttar Pradesh

**Semester-wise Course Structure**

**(w.e.f. 2025-26)**

**Program: B.Tech. in Mechanical Engineering**

## Batch: 2024-28

| SEMESTER I (1st Year: Odd Semester) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| PY111 | Classical Physics | IS | 3 | 1 | 0 | 11 |
| CY121 | Inorganic & Physical Chemistry | IS | 3 | 1 | 0 | 11 |
| MA123 | Applied Mathematics – I | IS | 3 | 1 | 0 | 11 |
| CH161 | Engineering Thermodynamics | IE | 3 | 1 | 0 | 11 |
| ME131 | Workshop | EP | 0 | 0 | 3 | 3 |
| PY111L | Physics Lab | IS | 0 | 0 | 2/2 | 1 |
| CY111L | Chemistry Lab | IS | 0 | 0 | 2/2 | 1 |
| | **Total Credits** | | | | | **49** |
| LM101 | Basic English* | LM | 1 | 2 | 0 | 7 |
| HU101 | Universal Human Value | HU | 1 | 1 | 0 | 5 |

*Basic English course to be taken by student on recommendation after Diagnostic Test

| SEMESTER II (1st Year: Even Semester) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| PY121 | Modern Physics | IS | 2 | 1 | 0 | 8 |
| CY111 | Organic & Hydrocarbon Chemistry | IS | 3 | 1 | 0 | 11 |
| MA124 | Applied Mathematics - II | IS | 3 | 1 | 0 | 11 |
| CS101 | Computer Programming | IE | 3 | 1 | 0 | 11 |
| CH121 | Fluid Mechanics | IE | 3 | 1 | 0 | 11 |
| ME101 | Mechanical Engineering Practices | EP | 1 | 0 | 2 | 5 |
| PY121L | Physics Lab | IS | 0 | 0 | 2/2 | 1 |
| CY121L | Chemistry Lab | IS | 0 | 0 | 2/2 | 1 |
| ME121 | Engineering Graphics | EP | 0 | 0 | 3 | 3 |
| CS101L | Computer Programming Lab | IE | 0 | 0 | 2 | 2 |
| | **Total Credits** | | | | | **64** |
| HU102 | Community Internship | HU | 1 | 2 | 0 | 5 |

| SEMESTER III (2nd Year: Odd Semester) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| ME211 | Fluid Machinery | DC | 3 | 0 | 0 | 9 |
| ME212 | Engineering Mechanics | DC | 3 | 0 | 0 | 9 |
| ME213 | Applied Thermodynamics | DC | 3 | 0 | 0 | 9 |
| ME214 | Materials Science | DC | 3 | 0 | 0 | 9 |
| MA222 | Applied Mathematics - III | IS | 3 | 1 | 0 | 11 |
| ECE102 | Fundamentals of Electronics Engineering | IE | 3 | 1 | 0 | 11 |
| ECE102L | Fundamentals of Electronics Engineering Lab | IE | 0 | 0 | 2 | 2 |
| ME215L | Mechanical Engineering Lab- I (ATD & EM) | DC | 0 | 0 | 2 | 2 |
| ME216L | Fluid Mechanics and Machinery Lab | DC | 0 | 0 | 2 | 2 |
| | **Total Credits** | | | | | **64** |

| SEMESTER IV (2nd Year: Even Semester) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| ME221 | Theory of Machines | DC | 3 | 0 | 0 | 9 |
| ME222 | Refrigeration and Air Conditioning | DC | 3 | 0 | 0 | 9 |
| ME223 | Strength of Materials | DC | 3 | 0 | 0 | 9 |
| ME224 | Manufacturing Processes – I | DC | 3 | 0 | 0 | 9 |
| CH232 | Heat and Mass Transfer | IE | 3 | 1 | 0 | 11 |
| ME225 | Measurement, Metrology, and Control System | DC | 3 | 0 | 0 | 9 |
| CH232L | Heat Transfer Lab | IE | 0 | 0 | 2 | 2 |
| ME223L | Strength of Material lab | DC | 0 | 0 | 2 | 2 |
| ME222L | Theory of Machines Lab | DC | 0 | 0 | 2 | 2 |
| | **Total Credits** | | | | | **62** |

**After Semester IV**

| Course/Subject | Category Code | L | T | P | Credit |
|---|---|---|---|---|---|
| Summer Internship/Project (4 weeks) | DP | 0 | 0 | 11* | 3 |

**3 Credits are equivalent to 10.5 hours ≈ 11 hours (P) per week if Summer Internship/Project will be completed in 4 weeks only.*

| **SEMESTER V (3rd Year: Odd Semester)** | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| ME311 | Design of Machine Elements | DC | 3 | 1 | 0 | 11 |
| ME312 | IC Engine & Gas Turbine | DC | 3 | 0 | 0 | 9 |
| ME313 | Manufacturing Processes – II | DC | 3 | 0 | 0 | 9 |
| ME314 | Industrial Engineering & Operation Research | DC | 3 | 0 | 0 | 9 |
| ME315 | Dynamics of Machine | DC | 2 | 0 | 0 | 6 |
| | DE1 | DE | 2 | 0 | 0 | 6 |
| | DE2 | DE | 2 | 0 | 0 | 6 |
| ME316L | Mechanical Engineering lab -II (RAC & ICE) | DC | 0 | 0 | 2 | 2 |
| ME311L | Machine Drawing | DC | 0 | 0 | 3 | 3 |
| | **Total Credits** | | | | | **61** |

| **SEMESTER VI (3rd Year: Even Semester)** | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| ME321 | Vibrations and Equipment design | DC | 3 | 0 | 0 | 9 |
| ME322 | Production Planning and Inventory Control | DC | 2 | 1 | 0 | 8 |
| ME323 | Finite Element Analysis | DC | 3 | 0 | 0 | 9 |
| ME324 | Power Plant Engineering | DC | 2 | 0 | 0 | 6 |
| ME325 | CAD & CAM | DC | 2 | 0 | 0 | 6 |
| | DE3 | DE | 3 | 0 | 0 | 9 |
| | DE4 | DE | 3 | 0 | 0 | 9 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ME325L | CAD & CAM Lab | DC | 0 | 0 | 2 | 2 |
| ME326 | Mechanical engineering Lab-III (Production) | DC | 0 | 0 | 2 | 2 |
| | **Total Credits** | | | | | **60** |

| **After Semester VI** | | | | | |
|---|---|---|---|---|---|
| **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| Summer Internship (6 weeks) | DP | 0 | 0 | 12* | 5 |

**5 Credits are equivalent to 11.67 hours ≈ 12 hours (P) per week if Summer Internship/Project will be completed in 6 weeks only.*

| **SEMESTER VII (4th Year: Odd Semester)** | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| PC111 | Professional Communications | LM | 2 | 1 | 0 | 8 |
| MT5100 | Principles of Economics | LM | 2 | 0 | 0 | 6 |
| MT5405 | Foundations of Management | LM | 2 | 0 | 0 | 6 |
| HU313 | Sociology of Industry and Work Culture | HU | 2 | 0 | 0 | 6 |
| HU331 | Organizational Psychology | HU | 2 | 0 | 0 | 6 |
| | OE1 | OE | 3 | 0 | 0 | 9 |
| | OE2 | OE | 3 | 0 | 0 | 9 |
| | Employability Skills and Industry Readiness | EP | 0 | 0 | 2 | 2 |
| | **Total Credits** | | | | | **52** |

| **SEMESTER VIII (4th Year: Even Semester)** | | | | | |
|---|---|---|---|---|---|
| **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| BTP (Internal/External) | DP | 0 | 0 | 40 | 40 |

**Summary of credits in different categories**

| **Code** | **Category** | **Min** | **Max** | **Offered** |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| HU | Humanities and Social Science | 22 | 22 | 22 |
| IS | Institute Science | 70 | 90 | 78 |
| IE | Institute Engineering | 40 | 70 | 61 |
| EP | Engineering Practices (Engineering Drawing, Workshop, etc.) | 18 | 24 | 13 |
| LM | Language & Management | 18 | 24 | 20 |
| DC | Departmental Core | 145 | 190 | 180 |
| DE | Departmental Elective | 30 | 75 | 30 |
| OE | Open Elective | 15 | 20 | 18 |
| DP | Project/ Industrial Visit | 20 | 50 | 48 |
| | **Total** | **440** | **490** | **470** |

| **DEPARTMENT ELECTIVES OFFERED** | | | | |
|---|---|---|---|---|
| **Stream** | **Course Code** | **Thermal Engineering** | **Course Code** | **Manufacturing Engineering** |
| DE1 (2-0-0) | ME317 | Turbo Machinery | ME319 | Additive manufacturing |
| DE2 (2-0-0) | ME318 | Automobile Engineering | ME320 | Micro-manufacturing process/Total quality management |
| DE3 (3-0-0) | ME327 | Computational Fluid Dynamics | ME329 | Computer Integrated Manufacturing |
| DE4 (3-0-0) | ME328 | Industrial Pollution and Control | ME330 | Robotics |

| **Humanities and Social Science (HU)** | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| HU101 | Universal Human Value | HU | 1 | 1 | 0 | 5 |
| HU102 | Community Internship | HU | 1 | 2 | 0 | 5 |
| HU313 | Sociology of Industry and Work Culture | HU | 2 | 0 | 0 | 6 |
| HU331 | Organizational Psychology | HU | 2 | 0 | 0 | 6 |
| | **Total** | | | | | **22** |

| Institute Science (IS) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| PY111 | Classical Physics | IS | 3 | 1 | 0 | 11 |
| CY111 | Organic & Hydrocarbon Chemistry | IS | 3 | 1 | 0 | 11 |
| MA123 | Applied Mathematics – I | IS | 3 | 1 | 0 | 11 |
| PY101L | Physics Lab | IS | 0 | 0 | 2/2 | 1 |
| CY101L | Chemistry Lab | IS | 0 | 0 | 2/2 | 1 |
| PY121 | Modern Physics | IS | 2 | 1 | 0 | 8 |
| CY121 | Inorganic & Physical Chemistry | IS | 3 | 1 | 0 | 11 |
| MA124 | Applied Mathematics - II | IS | 3 | 1 | 0 | 11 |
| PY121L | Physics Lab | IS | 0 | 0 | 2/2 | 1 |
| CY121L | Chemistry Lab | IS | 0 | 0 | 2/2 | 1 |
| MA222 | Applied Mathematics - III | IS | 3 | 1 | 0 | 11 |
| | **Total** | | | | | **78** |

| Institute Engineering (IE) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| CH161 | Engineering Thermodynamics | IE | 3 | 1 | 0 | 11 |
| CS101 | Computer Programming | IE | 3 | 1 | 0 | 11 |
| CH121 | Fluid Mechanics | IE | 3 | 1 | 0 | 11 |
| CS101L | Computer Programming Lab | IE | 0 | 0 | 2 | 2 |
| ECE102 | Fundamentals of Electronics Engineering | IE | 3 | 1 | 0 | 11 |
| ECE102L | Fundamentals of Electronics Engineering Lab | IE | 0 | 0 | 2 | 2 |
| CH232 | Heat and Mass Transfer | IE | 3 | 1 | 0 | 11 |
| CH232L | Heat Transfer Lab | IE | 0 | 0 | 2 | 2 |
| | **Total** | | | | | **61** |

| Engineering Practices (Engineering Drawing, Workshop, etc.) (EP) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| ME131 | Workshop | EP | 0 | 0 | 3 | 3 |
| ME101 | Mechanical Engineering Practices | EP | 1 | 0 | 2 | 5 |
| ME121 | Engineering Graphics | EP | 0 | 0 | 3 | 3 |
| | Employability Skills and Industry Readiness | EP | 0 | 0 | 2 | 2 |
| | **Total** | | | | | **13** |

| Language & Management (LM) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| MT5405 | Foundations of Management | LM | 2 | 0 | 0 | 6 |
| PC111 | Professional Communications | LM | 2 | 1 | 0 | 8 |
| MT5100 | Principles of Economics (Elective) | LM | 2 | 0 | 0 | 6 |
| | **Total** | | | | | **20** |

| Departmental Core (DC) | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| ME211 | Fluid Machinery | DC | 3 | 0 | 0 | 9 |
| ME212 | Engineering Mechanics | DC | 3 | 0 | 0 | 9 |
| ME213 | Applied Thermodynamics | DC | 3 | 0 | 0 | 9 |
| ME214 | Materials Science | DC | 3 | 0 | 0 | 9 |
| ME215L | Mechanical Engineering Lab- I (ATD & EM) | DC | 0 | 0 | 2 | 2 |
| ME216L | Fluid Mechanics and Machinery Lab | DC | 0 | 0 | 2 | 2 |
| ME221 | Theory of Machines | DC | 3 | 0 | 0 | 9 |
| ME222 | Refrigeration and Air Conditioning | DC | 3 | 0 | 0 | 9 |
| ME223 | Strength of Material | DC | 3 | 0 | 0 | 9 |
| ME224 | Manufacturing Processes – I | DC | 3 | 0 | 0 | 9 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ME225 | Measurement, Metrology, and Control System | DC | 3 | 0 | 0 | 9 |
| ME223L | Strength of Material lab | DC | 0 | 0 | 2 | 2 |
| ME222L | Theory of Machines Lab | DC | 0 | 0 | 2 | 2 |
| ME311 | Design of Machine Elements | DC | 3 | 1 | 0 | 11 |
| ME312 | IC Engine & Gas Turbine | DC | 3 | 0 | 0 | 9 |
| ME313 | Manufacturing Processes – II | DC | 3 | 0 | 0 | 9 |
| ME314 | Industrial Engineering & Operation Research | DC | 3 | 0 | 0 | 9 |
| ME315 | Dynamics of Machine | DC | 2 | 0 | 0 | 6 |
| ME316L | Mechanical Engineering lab -II (RAC & ICE) | DC | 0 | 0 | 2 | 2 |
| ME311L | Machine Drawing | DC | 0 | 0 | 3 | 3 |
| ME321 | Vibrations and Equipment design | DC | 3 | 0 | 0 | 9 |
| ME322 | Production Planning and Inventory Control | DC | 2 | 1 | 0 | 8 |
| ME323 | Finite Element Analysis | DC | 3 | 0 | 0 | 9 |
| ME324 | Power Plant Engineering | DC | 2 | 0 | 0 | 6 |
| ME325 | CAD & CAM | DC | 2 | 0 | 0 | 6 |
| ME325L | CAD & CAM Lab | DC | 0 | 0 | 2 | 2 |
| ME326 | Mechanical engineering Lab-III (Production) | DC | 0 | 0 | 2 | 2 |
| | **Total** | | | | | **180** |

| **Departmental Elective (DE)** | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| | DE1 | DE | 2 | 0 | 0 | 6 |
| | DE2 | DE | 2 | 0 | 0 | 6 |
| | DE3 | DE | 3 | 0 | 0 | 9 |
| | DE4 | DE | 3 | 0 | 0 | 9 |
| | **Total** | | | | | **30** |

| **Open Elective (OE)** | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | OE1 | OE | 3 | 0 | 0 | 9 |
| | OE2 | OE | 3 | 0 | 0 | 9 |
| | **Total** | | | | | **18** |

| **Departmental Project/ Industrial Visit (DP)** | | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **Course/Subject** | **Category Code** | **L** | **T** | **P** | **Credit** |
| | Summer Internship/Project (4 weeks) | DP | 0 | 0 | 11 | 3 |
| | Summer Internship (6 weeks) | DP | 0 | 0 | 12 | 5 |
| | BTP (Internal/External) | DP | 0 | 0 | 40 | 40 |
| | **Total** | | | | | **48** |