



# Curriculum and Syllabi

## B.E. MECHANICAL ENGINEERING

### SEMESTERS I to VIII

### Regulations 2025

**Programme: B.E. MECHANICAL ENGINEERING**

**2025 Regulations**

**(2025-29 Batch Onwards)**

**Curriculum for Semesters I to VIII**

**SEMESTER I**

| S. No.                       | Course Code | Course Title                            | Hours per week |   |   |    | Hours per sem |    |    |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|------------------------------|-------------|---|----------------|---|---|----|---------------|----|----|----|---------------------------------|---------|--------------------------|-----------------|
|                              |             |   | L              | T | P | SL | L             | T  | P  | SL |                                 |         |                          |                 |
| 1                            | 25IP101     | Makerspace - Induction Program          | -              | - | - | -  | -             | -  | -  | -  | -                               | 0       | -                        | -               |
| Theory Cum Practical Courses |             |   |                |   |   |    |               |    |    |    |                                 |         |                          |                 |
| 2                            | 25ES101     | Problem Solving Techniques using Python | 3              | 0 | 2 | 3  | 45            | 0  | 30 | 45 | 120                             | 4       | 50/50                    | ES              |
| 3                            | 25HS101     | English for Communication               | 3              | 0 | 2 | 3  | 45            | 0  | 30 | 45 | 120                             | 4       | 50/50                    | HS              |
| 4                            | 25ES102     | Innovation and Design Thinking          | 1              | 0 | 2 | 1  | 15            | 0  | 30 | 15 | 60                              | 2       | 100/0                    | ES              |
| Theory Courses               |             |   |                |   |   |    |               |    |    |    |                                 |         |                          |                 |
| 5                            | 25MA101     | Matrices and Calculus                   | 3              | 1 | 0 | 4  | 45            | 15 | 0  | 60 | 120                             | 4       | 40/60                    | BS              |
| 6                            | 25PH101     | Applied Engineering Physics             | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                    | BS              |
| 7                            | 25ES103     | Engineering Graphics                    | 2              | 1 | 0 | 3  | 30            | 15 | 0  | 45 | 90                              | 3       | 40/60                    | ES              |
| 8                            | 25AC101     | Heritage of Tamils                      | 1              | 0 | 0 | 1  | 15            | 0  | 0  | 15 | 30                              | 1       | 100/0                    | AC              |
| Practical Course             |             |   |                |   |   |    |               |    |    |    |                                 |         |                          |                 |
| 9                            | 25ES104     | Engineering Practices Laboratory        | 0              | 0 | 4 | 0  | 0             | 0  | 60 | 0  | 60                              | 2       | 60/40                    | ES              |

**SEMESTER II**

| S. No.                       | Course Code | Course Title                                     | Hours per week |   |   |    | Hours per sem |    |    |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|------------------------------|-------------|--|----------------|---|---|----|---------------|----|----|----|---------------------------------|---------|--------------------------|-----------------|
|                              |             |  | L              | T | P | SL | L             | T  | P  | SL |                                 |         |                          |                 |
| Theory Cum Practical Courses |             |  |                |   |   |    |               |    |    |    |                                 |         |                          |                 |
| 1                            | 25ES106     | Basics of Electrical and Electronics Engineering | 3              | 0 | 2 | 3  | 45            | 0  | 30 | 45 | 120                             | 4       | 50/50                    | ES              |
| 2                            | 25ES201     | Product Design and Development                   | 1              | 0 | 2 | 1  | 15            | 0  | 30 | 15 | 60                              | 2       | 100/0                    | ES              |
| 3                            | 25ME201     | Conventional and Digital Manufacturing           | 1              | 0 | 4 | 1  | 15            | 0  | 60 | 15 | 90                              | 3       | 50/50                    | PC              |
| Theory Courses               |             |  |                |   |   |    |               |    |    |    |                                 |         |                          |                 |
| 4                            | 25MA201     | Numerical Techniques                             | 3              | 1 | 0 | 4  | 45            | 15 | 0  | 60 | 120                             | 4       | 40/60                    | BS              |

| S. No. | Course Code | Course Title           | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|--------|-------------|------------------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|        |             |                        | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
| 5      | 25ES202     | Engineering Mechanics  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | ES              |
| 6      | 25CH201     | Engineering Chemistry  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | BS              |
| 7      | 25HS201     | Universal Human Values | 2              | 0 | 0 | 2  | 30            | 0 | 0 | 30 | 60                              | 2       | 40/60                    | HS              |
| 8      | 25HS202     | Business Communication | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | HS              |
| 9      | 25AC201     | Tamils and Technology  | 1              | 0 | 0 | 1  | 15            | 0 | 0 | 15 | 30                              | 1       | 100/0                    | AC              |
| 10     |             | Foreign Language       | 2              | 0 | 0 | 2  | 30            | 0 | 0 | 30 | 60                              | 2       | 100/0                    | HS              |
| 11     |             | Value Added Course     | 1              | 0 | 0 | 1  | 15            | 0 | 0 | 15 | 30                              | 1       | 100/0                    | VAC*            |

\*Value Added Course is Optional

### SEMESTER III

| S. No.                      | Course Code | Course Title  | Hours per week |   |   |    | Hours per sem |    |    |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|-----------------------------|-------------|---|----------------|---|---|----|---------------|----|----|----|---------------------------------|---------|--------------------------|-----------------|
|                             |             |   | L              | T | P | SL | L             | T  | P  | SL |                                 |         |                          |                 |
| Theory Cum Practical Course |             |   |                |   |   |    |               |    |    |    |                                 |         |                          |                 |
| 1                           | 25ME301     | Fluid Mechanics and Machinery                           | 1              | 0 | 4 | 1  | 15            | 0  | 60 | 15 | 90                              | 3       | 50/50                    | PC              |
| Theory Courses              |             |   |                |   |   |    |               |    |    |    |                                 |         |                          |                 |
| 2                           | 25MA301     | Transform Techniques and Partial Differential Equations | 3              | 1 | 0 | 4  | 45            | 15 | 0  | 60 | 120                             | 4       | 40/60                    | BS              |
| 3                           | 25ME302     | Strength of Materials                                   | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                    | PC              |
| 4                           | 25ES301     | Engineering Thermodynamics                              | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                    | ES              |
| 5                           | 25ME303     | Engineering Materials and Metallurgy                    | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                    | PC              |
| 6                           | 25EEC304    | Aptitude and Soft Skills - I                            | 1              | 0 | 0 | 1  | 15            | 0  | 0  | 15 | 30                              | 1       | 100/0                    | EEC             |
| Practical Courses           |             |   |                |   |   |    |               |    |    |    |                                 |         |                          |                 |
| 7                           | 25ME304     | Strength of Materials Laboratory                        | 0              | 0 | 4 | 0  | 0             | 0  | 60 | 0  | 60                              | 2       | 60/40                    | PC              |
| 8                           | 25ME305     | Machine Drawing with GD&T                               | 0              | 0 | 4 | 0  | 0             | 0  | 60 | 0  | 60                              | 2       | 60/40                    | PC              |
| 9                           | 25EEC305    | Industrial Training - I                                 | -              | - | - | -  | -             | -  | -  | -  | 2 Weeks                         | 1       | 100/0                    | EEC             |

### SEMESTER IV

| S. No.                      | Course Code | Course Title                         | Hours per week |   |   |    | Hours per sem |    |    |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|-----------------------------|-------------|--------------------------------------|----------------|---|---|----|---------------|----|----|----|---------------------------------|---------|-------------------------|-----------------|
|                             |             |                                      | L              | T | P | SL | L             | T  | P  | SL |                                 |         |                         |                 |
| Theory Cum Practical Course |             |                                      |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 1                           | 25ME401     | Theory of Machines                   | 1              | 0 | 4 | 1  | 15            | 0  | 60 | 15 | 90                              | 3       | 50/50                   | PC              |
| Theory Courses              |             |                                      |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 2                           | 25MA302     | Probability and Statistics           | 3              | 1 | 0 | 4  | 45            | 15 | 0  | 60 | 120                             | 4       | 40/60                   | BS              |
| 3                           | 25ME402     | Thermal Engineering                  | 3              | 1 | 0 | 4  | 45            | 15 | 0  | 60 | 120                             | 4       | 40/60                   | PC              |
| 4                           | 25ME403     | Green and Sustainable Manufacturing  | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | PC              |
| 5                           |             | Open Elective I                      | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | OE              |
| 6                           | 25EEC401    | Aptitude and Soft Skills - II        | 1              | 0 | 0 | 1  | 15            | 0  | 0  | 15 | 30                              | 1       | 100/0                   | EEC             |
| 7                           | 25MC405     | Disaster Management and Preparedness | 3              | 0 | 0 | 0  | 45            | 0  | 0  | 0  | 45                              | 0       | 100/0                   | MC              |
| Practical Courses           |             |                                      |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 8                           | 25ME404     | Thermal Engineering Laboratory       | 0              | 0 | 4 | 0  | 0             | 0  | 60 | 0  | 60                              | 2       | 60/40                   | PC              |
| 9                           | 25ME405     | Computer Aided Modelling Laboratory  | 0              | 0 | 4 | 0  | 0             | 0  | 60 | 0  | 60                              | 2       | 60/40                   | PC              |

### SEMESTER V

| S. No.                       | Course Code | Course Title               | Hours per week |   |   |    | Hours per sem |    |    |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|------------------------------|-------------|----------------------------|----------------|---|---|----|---------------|----|----|----|---------------------------------|---------|-------------------------|-----------------|
|                              |             |                            | L              | T | P | SL | L             | T  | P  | SL |                                 |         |                         |                 |
| Theory Cum Practical Courses |             |                            |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 1                            | 25ME501     | Heat and Mass Transfer     | 3              | 0 | 2 | 3  | 45            | 0  | 30 | 45 | 120                             | 4       | 50/50                   | PC              |
| 2                            | 25ES503     | Mechatronics and IoT       | 1              | 0 | 4 | 1  | 15            | 0  | 60 | 15 | 90                              | 3       | 50/50                   | ES              |
| Theory Courses               |             |                            |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 3                            | 25ME502     | Smart Manufacturing        | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | PC              |
| 4                            | 25ME503     | Design of Machine Elements | 3              | 1 | 0 | 4  | 45            | 15 | 0  | 60 | 120                             | 4       | 40/60                   | PC              |
| 5                            |             | Professional Elective I    |                |   |   |    |               |    |    |    | 90                              | 3       |                         | PE              |
| 6                            |             | Open Elective II           | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | OE              |
| 7                            |             | Open Elective III          | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | OE              |
| 8                            | 25MC501     | Industrial Safety          | 3              | 0 | 0 | 0  | 45            | 0  | 0  | 0  | 45                              | 0       | 100/0                   | MC              |
| Practical Course             |             |                            |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 9                            | 25EEC501    | Industrial Training - II   | -              | - | - | -  | -             | -  | -  | -  | 2 Weeks                         | 1       | 100/0                   | EEC             |
| For Honours Degree           |             |                            |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 1                            |             | Honours Elective I         |                |   |   |    |               |    |    |    | 90                              | 3       |                         |                 |
| 2                            |             | Honours                    |                |   |   |    |               |    |    |    | 90                              | 3       |                         |                 |

| S. No.           | Course Code | Course Title      | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|------------------|-------------|-------------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                  |             |                   | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
|                  |             | Elective II       |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| For Minor Degree |             |                   |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1                |             | Minor Elective I  |                |   |   |    |               |   |   | 90 | 3                               |         |                         |                 |
| 2                |             | Minor Elective II |                |   |   |    |               |   |   | 90 | 3                               |         |                         |                 |

### SEMESTER VI

| S. No.                       | Course Code | Course Title                                       | Hours per week |   |   |    | Hours per sem |    |    |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|------------------------------|-------------|--|----------------|---|---|----|---------------|----|----|----|---------------------------------|---------|-------------------------|-----------------|
|                              |             |  | L              | T | P | SL | L             | T  | P  | SL |                                 |         |                         |                 |
| Theory Cum Practical Courses |             |  |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 1                            | 25ME601     | Finite Element Analysis                            | 1              | 0 | 4 | 1  | 15            | 0  | 60 | 15 | 90                              | 3       | 50/50                   | PC              |
| 2                            | 25ME602     | Mechanical Measurements and Instrumentation        | 3              | 0 | 2 | 3  | 45            | 0  | 30 | 45 | 120                             | 4       | 50/50                   | PC              |
| Theory Courses               |             |  |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 3                            | 25ME603     | Heating, Ventilation, and Air conditioning Systems | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | PC              |
| 4                            | 25ME604     | Design of Transmission Elements                    | 3              | 1 | 0 | 4  | 45            | 15 | 0  | 60 | 120                             | 4       | 40/60                   | PC              |
| 5                            |             | Professional Elective II                           |                |   |   |    |               |    |    |    | 90                              | 3       |                         | PE              |
| 6                            |             | Professional Elective III                          |                |   |   |    |               |    |    |    | 90                              | 3       |                         | PE              |
| 7                            |             | Open Elective IV                                   | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | OE              |
| Practical Course             |             |  |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 8                            | 25MEP601    | Mini Project                                       | 0              | 0 | 4 | 0  | 0             | 0  | 60 | 0  | 60                              | 2       | 60/40                   | EEC             |
| For Honours Degree           |             |  |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 1                            |             | Honours Elective III                               |                |   |   |    |               |    |    |    | 90                              | 3       |                         |                 |
| 2                            |             | Honours Elective IV                                |                |   |   |    |               |    |    |    | 90                              | 3       |                         |                 |
| For Minor Degree             |             |  |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 1                            |             | Minor Elective III                                 |                |   |   |    |               |    |    |    | 90                              | 3       |                         |                 |
| 2                            |             | Minor Elective IV                                  |                |   |   |    |               |    |    |    | 90                              | 3       |                         |                 |

### SEMESTER VII

| S. No.         | Course Code | Course Title                  | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|-------------------------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |                               | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |                               |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 25ES701     | Industrial Automation and IoT | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | ES              |
| 2              | 25HS706     | Principle of Management       | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | HS              |

| S. No.             | Course Code | Course Title             | Hours per week |   |   |    | Hours per sem |   |    |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|--------------------|-------------|--------------------------|----------------|---|---|----|---------------|---|----|----|---------------------------------|---------|--------------------------|-----------------|
|                    |             |                          | L              | T | P | SL | L             | T | P  | SL |                                 |         |                          |                 |
|                    |             | and Engineering Ethics   |                |   |   |    |               |   |    |    |                                 |         |                          |                 |
| 3                  |             | Professional Elective IV |                |   |   |    |               |   |    |    | 90                              | 3       |                          | PE              |
| 4                  |             | Professional Elective V  |                |   |   |    |               |   |    |    | 90                              | 3       |                          | PE              |
| Practical Course   |             |                          |                |   |   |    |               |   |    |    |                                 |         |                          |                 |
| 5                  | 25MEP701    | Project Work - I         | 0              | 0 | 4 | 0  | 0             | 0 | 60 | 0  | 60                              | 2       | 100/0                    | EEC             |
| For Honours Degree |             |                          |                |   |   |    |               |   |    |    |                                 |         |                          |                 |
| 1                  |             | Honours Elective V       |                |   |   |    |               |   |    |    | 90                              | 3       |                          |                 |
| 2                  |             | Honours Elective VI      |                |   |   |    |               |   |    |    | 90                              | 3       |                          |                 |
| For Minor Degree   |             |                          |                |   |   |    |               |   |    |    |                                 |         |                          |                 |
| 1                  |             | Minor Elective V         |                |   |   |    |               |   |    |    | 90                              | 3       |                          |                 |
| 2                  |             | Minor Elective VI        |                |   |   |    |               |   |    |    | 90                              | 3       |                          |                 |

### SEMESTER VIII

| S. No.           | Course Code | Course Title      | Hours per week |   |    |    | Hours per sem |   |     |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|------------------|-------------|-------------------|----------------|---|----|----|---------------|---|-----|----|---------------------------------|---------|--------------------------|-----------------|
|                  |             |                   | L              | T | P  | SL | L             | T | P   | SL |                                 |         |                          |                 |
| Practical Course |             |                   |                |   |    |    |               |   |     |    |                                 |         |                          |                 |
| 1                | 25MEP801    | Project Work - II | 0              | 0 | 20 | 0  | 0             | 0 | 300 | 0  | 300                             | 10      | 60/40                    | EEC             |

**TOTAL NO. OF CREDITS: 167**

### FOREIGN LANGUAGE

| S. No.         | Course Code | Course Title | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|----------------|-------------|--------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|                |             |              | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
| Theory Courses |             |              |                |   |   |    |               |   |   |    |                                 |         |                          |                 |
| 1              | 25HS203     | German       | 2              | 0 | 0 | 2  | 30            | 0 | 0 | 30 | 60                              | 2       | 100/0                    | HS              |
| 2              | 25HS204     | Japanese     | 2              | 0 | 0 | 2  | 30            | 0 | 0 | 30 | 60                              | 2       | 100/0                    | HS              |

### VALUE ADDED COURSE

| S. No.         | Course Code | Course Title | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|----------------|-------------|--------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|                |             |              | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
| Theory Courses |             |              |                |   |   |    |               |   |   |    |                                 |         |                          |                 |
| 1              | 25VAC01     | French       | 1              | 0 | 0 | 1  | 15            | 0 | 0 | 15 | 30                              | 1       | 100/0                    | VAC             |
| 2              | 25VAC02     | Hindi        | 1              | 0 | 0 | 1  | 15            | 0 | 0 | 15 | 30                              | 1       | 100/0                    | VAC             |

**PROFESSIONAL ELECTIVE COURSES : VERTICALS**

| <b>VERTICAL I<br/>Modern Mobility<br/>Systems</b> | <b>VERTICAL II<br/>Product Design<br/>and Development</b> | <b>VERTICAL III<br/>Robotics and<br/>Automation</b> | <b>VERTICAL IV<br/>Digital and Green<br/>Manufacturing</b> | <b>VERTICAL V<br/>Process<br/>Equipment and<br/>Piping Design</b> | <b>VERTICAL VI<br/>Industrial<br/>Automation</b>               | <b>VERTICAL VII<br/>Computational<br/>Engineering</b> | <b>VERTICAL VIII<br/>Diversified<br/>Courses Group I</b> | <b>VERTICAL IX<br/>Diversified<br/>Courses<br/>Group II</b> |
|---|---|---|--|---|--|---|--|---|
| Electric and Hybrid Vehicle Technology            | Design for Manufacturing and Assembly                     | Mobile Robotics                                     | Introduction to Industry 4.0                               | Piping Systems Design and Analysis                                | Smart Mobility and Intelligent Vehicles                        | Computational Fluid Dynamics                          | Power Plant Engineering                                  | Power Generation Equipment Design                           |
| Battery Technology and Management Systems         | Materials Science for Design                              | AI and Machine Learning for Robotics                | Digital Twin and Cyber-Physical Systems                    | Process Equipment Design and Selection                            | Introduction to Industrial Automation Systems                  | Finite Element Method in Solid Mechanics              | Refrigeration and Air Conditioning                       | Turbo Machines  |
| Electric Powertrain Design                        | Geometric Dimensioning and Tolerancing                    | Industrial Robotics                                 | Additive Manufacturing                                     | Plant Layout and Process Integration                              | Embedded Systems and Programming                               | Data Science and Machine Learning for Engineering     | Automobile Engineering                                   | Non-Traditional Machining Processes                         |
| Vehicle Dynamics and Control for EVs              | Human Factors and Ergonomics                              | Mechatronics Systems Design                         | Sustainable Manufacturing Processes                        | Corrosion Engineering and Materials Selection                     | Factory Automation   | Computational Bio Mechanics                           | Drone Technology   | Operations Research   |
| Fuel Cell Systems                                 | Advanced Prototyping and Rapid Manufacturing              | Robot Kinematics and Dynamics                       | Renewable Energy and Energy Management                     | Pressure Vessel and Tank Design                                   | Digital Technologies with CPS, IIOT and Cloud in Manufacturing | Advanced Statistics and Data Analytics                | Non-Destructive Testing                                  | Process Planning and Cost Estimation                        |
| Micro-Mobility Systems                            | Machine Component Design                                  | Fundamentals of Robotics                            | Recycling and Waste Minimization                           | Applied Fluid Dynamics  | Cognitive Manufacturing – AI and Machine Vision                | Theory on Computation and Visualization               | Gas Dynamics and Jet Propulsion                          | Jigs and Fixtures Design                                    |
| 3D Printing for Mobility                          | Product Development Process and Management                | Robot Sensors and Vision                            | Environmental Compliance and Regulations                   | Design Codes and Standards  | Collaborative Robotic in Manufacturing with AI, ML, IIOT       |   |  |   |

### VERTICAL I : Modern Mobility Systems

| S. No.         | Course Code | Course Title                              | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|---|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |   | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |   |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 25PME11     | Electric and Hybrid Vehicle Technology    | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 2              | 25PME12     | Battery Technology and Management Systems | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 3              | 25PME13     | Electric Powertrain Design                | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 4              | 25PME14     | Vehicle Dynamics and Control for EVs      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 5              | 25PME15     | Fuel Cell Systems                         | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 6              | 25PME16     | Micro-Mobility Systems                    | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 7              | 25PME17     | 3D Printing for Mobility                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

### VERTICAL II : Product Design and Development

| S. No.                      | Course Code | Course Title                                 | Hours per week |   |   |    | Hours per sem |    |    |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|-----------------------------|-------------|--|----------------|---|---|----|---------------|----|----|----|---------------------------------|---------|-------------------------|-----------------|
|                             |             |  | L              | T | P | SL | L             | T  | P  | SL |                                 |         |                         |                 |
| Theory Courses              |             |  |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 1                           | 25PME21     | Design for Manufacturing and Assembly        | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | PE              |
| 2                           | 25PME22     | Materials Science for Design                 | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | PE              |
| 3                           | 25PME23     | Geometric Dimensioning and Tolerancing       | 2              | 1 | 0 | 3  | 30            | 15 | 0  | 45 | 90                              | 3       | 40/60                   | PE              |
| 4                           | 25PME24     | Human Factors and Ergonomics                 | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | PE              |
| Theory Cum Practical Course |             |  |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 5                           | 25PME25     | Advanced Prototyping and Rapid Manufacturing | 2              | 0 | 2 | 2  | 30            | 0  | 30 | 30 | 90                              | 3       | 50/50                   | PE              |
| Theory Courses              |             |  |                |   |   |    |               |    |    |    |                                 |         |                         |                 |
| 6                           | 25PME26     | Machine Component Design                     | 2              | 1 | 0 | 3  | 30            | 15 | 0  | 45 | 90                              | 3       | 40/60                   | PE              |
| 7                           | 25PME27     | Product Development Process and Management   | 3              | 0 | 0 | 3  | 45            | 0  | 0  | 45 | 90                              | 3       | 40/60                   | PE              |

### VERTICAL III : Robotics and Automation

| S. No.         | Course Code | Course Title                         | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|--------------------------------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |                                      | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |                                      |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 25PME31     | Mobile Robotics                      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 2              | 25PME32     | AI and Machine Learning for Robotics | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 3              | 25PME33     | Industrial Robotics                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 4              | 25PME34     | Mechatronics Systems Design          | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 5              | 25PME35     | Robot Kinematics and Dynamics        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 6              | 25PME36     | Fundamentals of Robotics             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 7              | 25PME37     | Robot Sensors and Vision             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

### VERTICAL IV : Digital and Green Manufacturing

| S. No.         | Course Code | Course Title                             | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|--|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |  | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |  |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 25PME41     | Introduction to Industry 4.0             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 2              | 25PME42     | Digital Twin and Cyber-Physical Systems  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 3              | 25PME43     | Additive Manufacturing                   | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 4              | 25PME44     | Sustainable Manufacturing Processes      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 5              | 25PME45     | Renewable Energy and Energy Management   | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 6              | 25PME46     | Recycling and Waste Minimization         | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 7              | 25PME47     | Environmental Compliance and Regulations | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

### VERTICAL V : Process Equipment and Piping Design

| S. No.         | Course Code | Course Title                       | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|------------------------------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |                                    | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |                                    |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 25PME51     | Piping Systems Design and Analysis | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

| S. No. | Course Code | Course Title                                  | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|--------|-------------|---|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|        |             |   | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| 2      | 25PME52     | Process Equipment Design and Selection        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 3      | 25PME53     | Plant Layout and Process Integration          | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 4      | 25PME54     | Corrosion Engineering and Materials Selection | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 5      | 25PME55     | Pressure Vessel and Tank Design               | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 6      | 25PME56     | Applied Fluid Dynamics                        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 7      | 25PME57     | Design Codes and Standards                    | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

### VERTICAL VI : Industrial Automation

| S. No.         | Course Code | Course Title   | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|--|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |  | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |  |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 25PME61     | Smart Mobility and Intelligent Vehicles                        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 2              | 25PME62     | Introduction to Industrial Automation Systems                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 3              | 25PME63     | Embedded Systems and Programming                               | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 4              | 25PME64     | Factory Automation   | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 5              | 25PME65     | Digital Technologies with CPS, IIOT and Cloud in Manufacturing | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 6              | 25PME66     | Cognitive Manufacturing – AI and Machine Vision                | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 7              | 25PME67     | Collaborative Robotic in Manufacturing with AI, ML, IIOT       | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

### VERTICAL VII : Computational Engineering

| S. No.         | Course Code | Course Title | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|--------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |              | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |              |                |   |   |    |               |   |   |    |                                 |         |                         |                 |

| S. No. | Course Code | Course Title                                      | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|--------|-------------|---|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|        |             |   | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| 1      | 25PME71     | Computational Fluid Dynamics                      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 2      | 25PME72     | Finite Element Method in Solid Mechanics          | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 3      | 25PME73     | Data Science and Machine Learning for Engineering | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 4      | 25PME74     | Computational Bio Mechanics                       | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 5      | 25PME75     | Advanced Statistics and Data Analytics            | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 6      | 25PME76     | Theory on Computation and Visualization           | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

### VERTICAL VIII : Diversified Courses Group I

| S. No.         | Course Code | Course Title                       | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|------------------------------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |                                    | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |                                    |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 25PME81     | Power Plant Engineering            | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 2              | 25PME82     | Refrigeration and Air Conditioning | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 3              | 25PME83     | Automobile Engineering             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 4              | 25PME84     | Drone Technology                   | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 5              | 25PME85     | Non-Destructive Testing            | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 6              | 25PME86     | Gas Dynamics and Jet Propulsion    | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

### VERTICAL IX : Diversified Courses Group II

| S. No.         | Course Code | Course Title                         | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|--------------------------------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |                                      | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |                                      |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 25PME91     | Power Generation Equipment Design    | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 2              | 25PME92     | Turbo Machines                       | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 3              | 25PME93     | Non-Traditional Machining Processes  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 4              | 25PME94     | Operations Research                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 5              | 25PME95     | Process Planning and Cost Estimation | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |
| 6              | 25PME96     | Jigs and Fixtures Design             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | PE              |

## OPEN ELECTIVES

| S. No.         | Course Code | Course Title  | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|----------------|-------------|---|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|                |             |   | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
| Theory Courses |             |   |                |   |   |    |               |   |   |    |                                 |         |                          |                 |
| 1              | 25OHS11     | Foundation Skills in Integrated Product Development | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 2              | 25OHS12     | Human Rights  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 3              | 25OHS13     | Intellectual Property Rights                        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 4              | 25OHS14     | Sustainable Management                              | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 5              | 25OHS15     | Supply Chain Management                             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 6              | 25OAG11     | Bioenergy and Waste Utilization                     | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 7              | 25OAG12     | Agribusiness and Entrepreneurship                   | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 8              | 25OAG13     | Precision Agriculture and Smart Farming             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 9              | 25OAG14     | GIS and Remote Sensing Applications                 | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 10             | 25OAG15     | Renewable Energy in Agriculture                     | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 11             | 25OAG16     | Post-Harvest Engineering                            | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 12             | 25OIT11     | UI & UX Design                                      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 13             | 25OIT12     | High Performance Computing                          | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 14             | 25OCY11     | Information Security                                | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 15             | 25OCY12     | Cyber Physical Systems                              | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 16             | 25OCY13     | Information Retrieval System                        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 17             | 25OAI11     | Intelligent Healthcare Solutions                    | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 18             | 25OCS12     | Cloud Web Services                                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 19             | 25OCS13     | Blockchain Technologies                             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 20             | 25OCS14     | Data Mining   | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 21             | 25OML12     | AI for Precision Agriculture                        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 22             | 25OBT11     | Microbiology  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 23             | 25OBT12     | Nano Biotechnology                                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 24             | 25OBT13     | Immuno Technology                                   | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 25             | 25OBT14     | Genomics and Proteomics                             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 26             | 25OBT15     | Basic Industrial Biotechnology                      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 27             | 25OEC11     | Wireless  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |

| S. No. | Course Code | Course Title                                    | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|--------|-------------|---|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|        |             |   | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
|        |             | Communication                                   |                |   |   |    |               |   |   |    |                                 |         |                          |                 |
| 28     | 25OEC12     | Internet of Things and Applications             | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 29     | 25OEC13     | Embedded Systems                                | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 30     | 25OEC14     | Introduction to Quantum Communication           | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 31     | 25OEC15     | Introduction to Quantum Sensing                 | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 32     | 25OEC16     | Engineering Foundations of Quantum Technologies | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 33     | 25OEC17     | Solid State Physics for Quantum Technologies    | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 34     | 25OEC18     | Quantum Optics                                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |

**VERTICALS FOR MINOR DEGREE (In addition to all the verticals of other programmes)**

| <b>VERTICAL I<br/>Fintech and Block<br/>Chain</b> | <b>VERTICAL II<br/>Entrepreneurship</b>              | <b>VERTICAL III<br/>Public<br/>Administration</b>         | <b>VERTICAL IV<br/>Business Data<br/>Analytics</b> | <b>VERTICAL V<br/>Environment and<br/>Sustainability</b> | <b>VERTICAL VI<br/>Quantum<br/>Technologies</b>                                   |
|---|--|---|--|--|---|
| Finance for Managers                              | Foundations of Entrepreneurship                      | Principles of Public Administration                       | Statistics for Management                          | Sustainable Infrastructure Development                   | Foundations of Quantum Computing: Physics, Engineering, and Mathematics Computing |
| Fundamentals of Investment                        | Team Building and Leadership Management for Business | Public Finance and Budgeting                              | Business Analytics and Decision-Making             | Sustainable Agriculture and Environmental Management     | Survey of Quantum Technologies and Applications                                   |
| Banking, Financial Services and Insurance         | Creativity and Innovation in Entrepreneurship        | Public Personnel Administration                           | Human Resource Analytics                           | Sustainable Bio Materials                                | Foundations of Quantum Technologies   |
| Introduction to Blockchain and its Applications   | Principles of Marketing Management for Business      | Administrative Law and Governance                         | Marketing and Social Media Web Analytics           | Materials for Energy Sustainability                      | Basic Laboratory Course for Quantum Technologies                                  |
| Fintech Personal Finance and Payments             | Human Resource Management for Entrepreneurs          | Indian Administrative System                              | Operation and Supply Chain Analytics               | Waste Management and Circular Economy                    | Introduction to Quantum Computation   |
| Introduction to Fintech                           | Financing New Business Ventures                      | Public Policy Administration                              | Financial Analytics                                | Environmental Quality Monitoring and Analysis            | Introduction to Quantum Materials   |
|   |  | Comparative Public Administration and Development Studies |  | Integrated Energy Planning for Sustainable Development   |   |
|   |  |   |  | Energy Efficiency for Sustainable Development            |   |

### VERTICAL I : Fintech and Block Chain

| S. No.         | Course Code | Course Title                                    | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|----------------|-------------|---|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|                |             |   | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
| Theory Courses |             |   |                |   |   |    |               |   |   |    |                                 |         |                          |                 |
| 1              | 25OMI11     | Finance for Managers                            | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 2              | 25OMI12     | Fundamentals of Investment                      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 3              | 25OMI13     | Banking, Financial Services and Insurance       | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 4              | 25OMI14     | Introduction to Blockchain and its Applications | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 5              | 25OMI15     | Fintech Personal Finance and Payments           | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 6              | 25OMI16     | Introduction to Fintech                         | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |

### VERTICAL II : Entrepreneurship

| S. No.         | Course Code | Course Title   | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|----------------|-------------|--|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|                |             |  | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
| Theory Courses |             |  |                |   |   |    |               |   |   |    |                                 |         |                          |                 |
| 1              | 25OMI21     | Foundations of Entrepreneurship                      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 2              | 25OMI22     | Team Building and Leadership Management for Business | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 3              | 25OMI23     | Creativity and Innovation in Entrepreneurship        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 4              | 25OMI24     | Principles of Marketing Management for Business      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 5              | 25OMI25     | Human Resource Management for Entrepreneurs          | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 6              | 25OMI26     | Financing New Business Ventures                      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |

### VERTICAL III : Public Administration

| S. No.         | Course Code | Course Title                        | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|----------------|-------------|-------------------------------------|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|                |             |                                     | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
| Theory Courses |             |                                     |                |   |   |    |               |   |   |    |                                 |         |                          |                 |
| 1              | 25OMI31     | Principles of Public Administration | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 2              | 25OMI32     | Public Finance and Budgeting        | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |

| S. No. | Course Code | Course Title  | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|--------|-------------|---|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|        |             |   | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| 3      | 250MI33     | Public Personnel Administration                           | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 4      | 250MI34     | Administrative Law and Governance                         | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 5      | 250MI35     | Indian Administrative System                              | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 6      | 250MI36     | Public Policy Administration                              | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 7      | 250MI37     | Comparative Public Administration and Development Studies | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |

#### VERTICAL IV : Business Data Analytics

| S. No.         | Course Code | Course Title                             | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|--|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |  | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |  |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 250MI41     | Statistics for Management                | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 2              | 250MI42     | Business Analytics and Decision-Making   | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 3              | 250MI43     | Human Resource Analytics                 | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 4              | 250MI44     | Marketing and Social Media Web Analytics | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 5              | 250MI45     | Operation and Supply Chain Analytics     | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 6              | 250MI46     | Financial Analytics                      | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |

#### VERTICAL V : Environment and Sustainability

| S. No.         | Course Code | Course Title   | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/External Marks | Course Category |
|----------------|-------------|--|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|-------------------------|-----------------|
|                |             |  | L              | T | P | SL | L             | T | P | SL |                                 |         |                         |                 |
| Theory Courses |             |  |                |   |   |    |               |   |   |    |                                 |         |                         |                 |
| 1              | 250MI51     | Sustainable Infrastructure Development               | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 2              | 250MI52     | Sustainable Agriculture and Environmental Management | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 3              | 250MI53     | Sustainable Bio Materials                            | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |
| 4              | 250MI54     | Materials for Energy Sustainability                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                   | OE              |

| S. No. | Course Code | Course Title   | Hours per week |   |   |    | Hours per sem |   |   |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|--------|-------------|--|----------------|---|---|----|---------------|---|---|----|---------------------------------|---------|--------------------------|-----------------|
|        |             |  | L              | T | P | SL | L             | T | P | SL |                                 |         |                          |                 |
| 5      | 25OMI55     | Waste Management and Circular Economy                  | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 6      | 25OMI56     | Environmental Quality Monitoring and Analysis          | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 7      | 25OMI57     | Integrated Energy Planning for Sustainable Development | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |
| 8      | 25OMI58     | Energy Efficiency for Sustainable Development          | 3              | 0 | 0 | 3  | 45            | 0 | 0 | 45 | 90                              | 3       | 40/60                    | OE              |

### VERTICAL VI : Quantum Technologies

| S. No.           | Course Code | Course Title  | Hours per week |   |   |    | Hours per sem |   |    |    | Total no. of Hours per semester | Credits | Internal/ External Marks | Course Category |
|------------------|-------------|---|----------------|---|---|----|---------------|---|----|----|---------------------------------|---------|--------------------------|-----------------|
|                  |             |   | L              | T | P | SL | L             | T | P  | SL |                                 |         |                          |                 |
| Theory Courses   |             |   |                |   |   |    |               |   |    |    |                                 |         |                          |                 |
| 1                | 25OMI61     | Foundations of Quantum Computing: Physics, Engineering, and Mathematics Computing | 3              | 0 | 0 | 3  | 45            | 0 | 0  | 45 | 90                              | 3       | 40/60                    | OE              |
| 2                | 25OMI62     | Survey of Quantum Technologies and Applications                                   | 3              | 0 | 0 | 3  | 45            | 0 | 0  | 45 | 90                              | 3       | 40/60                    | OE              |
| 3                | 25OMI63     | Foundations of Quantum Technologies   | 3              | 0 | 0 | 3  | 45            | 0 | 0  | 45 | 90                              | 3       | 40/60                    | OE              |
| Practical Course |             |   |                |   |   |    |               |   |    |    |                                 |         |                          |                 |
| 4                | 25OMI64     | Basic Laboratory Course for Quantum Technologies                                  | 2              | 0 | 2 | 2  | 30            | 0 | 30 | 30 | 90                              | 3       | 50/50                    | OE              |
| Theory Courses   |             |   |                |   |   |    |               |   |    |    |                                 |         |                          |                 |
| 5                | 25OMI65     | Introduction to Quantum Computation   | 3              | 0 | 0 | 3  | 45            | 0 | 0  | 45 | 90                              | 3       | 40/60                    | OE              |
| 6                | 25OMI66     | Introduction to Quantum Materials   | 3              | 0 | 0 | 3  | 45            | 0 | 0  | 45 | 90                              | 3       | 40/60                    | OE              |

### SUMMARY

| S.No.         | COURSE CATEGORY | CREDITS AS PER SEMESTER |    |     |    |    |    |     |      | TOTAL CREDITS |
|---------------|-----------------|-------------------------|----|-----|----|----|----|-----|------|---------------|
|               |                 | I                       | II | III | IV | V  | VI | VII | VIII |               |
| 1             | HS              | 4                       | 7  |     |    |    |    | 3   |      | 14            |
| 2             | BS              | 7                       | 7  | 4   | 4  |    |    |     |      | 22            |
| 3             | ES              | 11                      | 9  | 3   |    | 3  |    | 3   |      | 29            |
| 4             | PC              |                         | 3  | 13  | 14 | 11 | 14 |     |      | 55            |
| 5             | PE              |                         |    |     |    | 3  | 6  | 6   |      | 15            |
| 6             | OE              |                         |    |     | 3  | 6  | 3  |     |      | 12            |
| 7             | EEC             |                         |    | 2   | 1  | 1  | 2  | 2   | 10   | 18            |
| 8             | AC              | 1                       | 1  |     |    |    |    |     |      | 2             |
| 9             | MC              |                         |    |     | ✓  | ✓  |    |     |      |               |
| TOTAL CREDITS |                 | 23                      | 27 | 22  | 22 | 24 | 25 | 14  | 10   | 167           |