



# VINAYAKA MISSION'S RESEARCH FOUNDATION

(Deemed to be University under section 3 of the UGC Act 1956)

**BACHELOR OF CIVIL ENGINEERING/TECHNOLOGY (BE / B.Tech.)**

**DEGREE PROGRAMME – WORKING PROFESSIONAL**

**CURRICULUM AND SYLLABI**

**CHOICE BASED CREDIT SYSTEM (CBCS)**

**UNDER FACULTY OF ENGINEERING AND TECHNOLOGY**

**(Semester I to VII)**

**REGULATIONS 2025**

**(FOR THE STUDENTS ADMITTED FROM 2025 ONWARDS)**

### **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

|              |  |
|--------------|--|
| <b>PEO 1</b> | Graduates will perform as professional engineers in the various fields of Civil engineering.                 |
| <b>PEO 2</b> | Graduates will perform well in their specialized field and also trained in teamwork and leadership positions |
| <b>PEO 3</b> | Graduates will pursue lifelong learning in their specialized fields of Civil Engineering                     |
| <b>PEO 4</b> | Graduates will exhibit entrepreneurship qualities.   |
| <b>PEO 5</b> | Graduates will contribute to the development of the profession, nation and society                           |

### **PROGRAM SPECIFIC OUTCOMES (PSOs)**

To achieve the mission of the program, Civil Engineering graduates will be able:

|              |  |
|--------------|--|
| <b>PSO 1</b> | To work independently as well as in team to formulate, design, execute solutions for engineering problems and also analyze, synthesize technical data for application to product, process, system design & development |
| <b>PSO 2</b> | To understand & contribute towards social, environmental issues, following professional ethics and codes of conduct and embrace lifelong learning for continuous improvement   |
| <b>PSO 3</b> | To develop expertise towards use of modern engineering tools, careers in industries and research and demonstrate entrepreneurial skill   |

## PROGRAMME OUTCOMES

Engineering Graduates will be able to:

|             |  |
|-------------|--|
| <b>PO 1</b> | <b>Engineering Knowledge:</b> Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.   |
| <b>PO 2</b> | <b>Problem Analysis:</b> Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)  |
| <b>PO 3</b> | <b>Design/Development of Solutions:</b> Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5) |
| <b>PO 4</b> | <b>Conduct Investigations of Complex Problems:</b> Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).  |
| <b>PO 5</b> | <b>Engineering Tool Usage:</b> Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)   |
| <b>PO 6</b> | <b>The Engineer and The World:</b> Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).                                       |
| <b>PO 7</b> | <b>Ethics:</b> Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)   |
| <b>PO 8</b> | <b>Individual and Collaborative Teamwork:</b> Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.  |
| <b>PO 9</b> | <b>Communication:</b> Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences                      |
| <b>PO10</b> | <b>Project Management and Finance:</b> Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.  |
| <b>PO11</b> | <b>Life-Long Learning:</b> Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)  |

**B.E. - Choice Based Credit System - 2025 onwards**  
**Regulation: R 2025 Name of the Board: Civil Engineering**  
**Name of the Program: B.E. – Civil Engineering WORKING PROFESSIONAL**  
**STRUCTURE OF BACHELOR OF ENGINEERING PROGRAMME FOR**  
**WORKING PROFESSIONALS**

| Sl. No.   | Category of Courses and Credits  | Types of Courses  | Suggested Breakup of Credits (min – max)                      |  |
|---|--|---|---|--|
| 1.  | A. Foundation Courses (9)  | Humanities and Social Sciences  | 3   |  |
| 2.  |  | Basic Science courses, Engineering Science courses including workshop, drawing, basics of electrical / mechanical /computer etc., | 6   |  |
| 3.  | B. Professional Core (62)  | Core courses  | 62  |  |
| 4.  | C. Elective Courses (36)   | Professional Electives/Specialization Electives   | 12 – 15   |  |
|   |  | <b>Industry Electives:</b><br>Industry Designed/ Industry Supported/ Industry Sponsored courses / Industry Integrated             | 3 – 9   |  |
|   |  | Vocational Skill Development Courses  | 2   |  |
|   |  | Open Electives  | Innovation and Entrepreneurship                               | 3 – 9  |
|   |  |   | Interdepartmental Open Electives including Management courses | 3 -9   |
|   |  |   | Special Electives (Any one)                                   | Lean Six Sigma<br>Project Management and Team Work |
| University Multidisciplinary Open Electives   | 1  |   |   |  |
| 5.  | D. IKS (2)   | Indian Knowledge Systems  | 2   |  |
| 6.  | E. DT (1)  | Design Thinking   | 1   |  |
| 7.  | F. Courses for Presentation of technical Skills related to the specialization (11)       | Mini Project  | 3   |  |
|   |  | Project Work  | 8   |  |
| 8.  | **G. Mandatory Courses (4) (to be completed 1 <sup>st</sup> to 6 <sup>th</sup> semester) | Research Methodology  | 1   |  |
|   |  | Environmental Sciences  | 1   |  |
|   |  | Indian Constitution   | 1   |  |
|   |  | Yoga and Mediation  | 1   |  |
| <b>Minimum Credits to be earned</b>   |  |   | <b>125</b>  |  |
| <b>** The credits earned in category ‘G’ Courses will not be counted in CGPA calculation.</b> |  |   |   |  |

| <b>A. Foundation Courses</b>  |      |        |                |          |   |   |   |   |              |
|---|------|--------|----------------|----------|---|---|---|---|--------------|
| <b>Humanities and Social Sciences including Management Courses –Credits (3)</b> |      |        |                |          |   |   |   |   |              |
| S. No.  | CODE | COURSE | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |

|    |          |                                 |     |       |   |   |   |   |     |
|----|----------|---------------------------------|-----|-------|---|---|---|---|-----|
| 1. | 34125H01 | Technical English Communication | ENG | FC-HS | 2 | 0 | 0 | 2 | NIL |
| 2  | 34125H81 | English Language Lab            | ENG | FC-HS | 0 | 0 | 2 | 1 | NIL |

**Basic Science courses, Engineering Science courses (6)**

| S. No. | CODE     | COURSE                                     | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|----------|--|----------------|----------|---|---|---|---|--------------|
| 1.     | 34125F01 | Matrices and Calculus                      | MATHS          | FC-BS    | 2 | 1 | 0 | 3 | NIL          |
| 2.     | 34225F01 | Biology for Civil Engineers                | CIVIL          | FC-BS    | 3 | 0 | 0 | 3 | NIL          |
| 3.     | 34425F02 | Basics of Civil and Mechanical Engineering | CIVIL & MECH   | FC-ES    | 2 | 2 | 0 | 4 | NIL          |
| 4.     | 34225F02 | Mechanics of Structures                    | CIVIL          | FC-ES    | 2 | 1 | 0 | 3 | NIL          |
| 5.     | 34225F81 | Fabrication Laboratory for Civil Engineers | CIVIL          | FC-ES    | 0 | 0 | 4 | 2 | NIL          |

### B. Professional Courses (62)

#### Core courses

| S. No. | CODE     | COURSE  | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE  |
|--------|----------|---|----------------|----------|---|---|---|---|---|
| 1      | 34225C01 | Construction Materials and Techniques (Theory and Practicals) | CIVIL          | CC-C     | 3 | 0 | 2 | 4 | NIL   |
| 2      | 34225C11 | Strength of Materials   | CIVIL          | CC-C     | 2 | 1 | 0 | 3 | NIL   |
| 3      | 34225C07 | Fluids Mechanics and Hydraulic Engineering                    | CIVIL          | CC-C     | 2 | 1 | 0 | 3 | NIL   |
| 4      | 34225C05 | Engineering Surveying and Geomatics (Theory and Practicals)   | CIVIL          | CC-C     | 2 | 1 | 4 | 5 | NIL   |
| 5      | 34225C06 | Environmental Engineering and Design (Theory and Practicals)  | CIVIL          | CC-C     | 2 | 1 | 2 | 4 | NIL   |
| 6      | 34225C13 | Sustainable Green Construction                                | CIVIL          | CC-C     | 3 | 0 | 0 | 3 | NIL   |
| 7      | 34225C14 | Transportation Engineering                                    | CIVIL          | CC-C     | 3 | 0 | 0 | 3 | NIL   |
| 8      | 34225C08 | Geotechnical Engineering (Theory And Practicals)              | CIVIL          | CC-C     | 2 | 1 | 2 | 4 | NIL   |
| 9      | 34225C12 | Structural Analysis   | CIVIL          | CC-C     | 2 | 1 | 0 | 3 | Strength of Materials   |
| 10     | 34225C09 | Modern Method of Structural Analysis                          | CIVIL          | CC-C     | 2 | 1 | 0 | 3 | Structural Analysis   |
| 11     | 34225C02 | Design of Reinforced Concrete Elements                        | CIVIL          | CC-C     | 2 | 1 | 0 | 3 | Strength of Materials   |
| 12     | 34225C15 | Design of Reinforced Concrete Structures                      | CIVIL          | CC-C     | 2 | 1 | 0 | 3 | Design of Reinforced Concrete Elements                        |
| 13     | 34225C03 | Design of Steel Structures                                    | CIVIL          | CC-C     | 2 | 1 | 0 | 3 | Strength of Materials   |
| 14     | 34225C04 | Engineering Economics, Estimation and Costing                 | CIVIL          | CC-C     | 2 | 1 | 0 | 3 | NIL   |
| 15     | 34225C10 | Robotics and Automation in Construction                       | CIVIL          | CC-C     | 3 | 0 | 0 | 3 | NIL   |
| 16     | 34225C81 | Computer Aided Building Drawing Laboratory                    | CIVIL          | CC-C     | 0 | 0 | 4 | 2 | NIL   |
| 17     | 34225C84 | Strength of Materials Laboratory                              | CIVIL          | CC-C     | 0 | 0 | 4 | 2 | NIL   |
| 18     | 34225C83 | Fluids Mechanics and Hydraulic Engineering Laboratory         | CIVIL          | CC-C     | 0 | 0 | 4 | 2 | NIL   |
| 19     | 34225C82 | Concrete and Construction Technology Laboratory               | CIVIL          | CC-C     | 0 | 0 | 4 | 2 | Construction Materials and Techniques (Theory and Practicals) |
| 20     | 34225C86 | Survey Camp   | CIVIL          | CC-C     | 0 | 0 | 4 | 2 | Engineering Surveying and Geomatics (Theory and Practicals)   |
| 21     | 34225C85 | Structural Design Laboratory                                  | CIVIL          | CC-C     | 0 | 0 | 4 | 2 | Design of Reinforced Concrete Elements                        |

### C. Elective Courses (34)

#### Professional Electives (12 – 15)

| S. No. | CODE     | COURSE                                    | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE  |
|--------|----------|---|----------------|----------|---|---|---|---|---|
| 1      | 34225P09 | Engineering Geology                       | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 2      | 34225P14 | Hydrology                                 | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 3      | 34225P20 | Remote Sensing and GIS                    | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 4      | 34225P07 | Disaster Management                       | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 5      | 34225P13 | Housing Planning and Management           | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 6      | 34225P17 | Optimization Method For Civil Engineering | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 7      | 34225P26 | Wind Engineering                          | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 8      | 34225P06 | Contract Laws and Regulations             | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 9      | 34225P22 | Solid Waste Management                    | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 10     | 34225P05 | Construction Planning and Scheduling      | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL   |
| 11     | 34225P16 | Irrigation Engineering                    | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | Fluids Mechanics and Hydraulic Engineering                    |
| 12     | 34225P21 | Repair and Rehabilitation of Structures   | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | Construction Materials and Techniques (Theory and Practicals) |
| 13     | 34225P25 | Traffic Engineering and Management        | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | Transportation Engineering                                    |
| 14     | 34225P11 | Ground Improvement Techniques             | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | Geotechnical Engineering (Theory and Practicals)              |
| 15     | 34225P08 | Electronic Surveying                      | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | Engineering Surveying and Geomatics (Theory and Practicals)   |
| 16     | 34225P02 | Air Pollution Management                  | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | Environmental Engineering and Design (Theory And Practicals)  |
| 17     | 34225P03 | Bridge Structures                         | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | Design of Steel Structures                                    |
| 18     | 34225P24 | Tall Buildings                            | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | Design of Steel Structures                                    |

|    |          |                           |       |       |   |   |   |   |   |
|----|----------|---------------------------|-------|-------|---|---|---|---|---|
| 19 | 34225P23 | Structural Dynamics       | CIVIL | EC-PS | 3 | 0 | 0 | 3 | Structural Analysis   |
| 20 | 34225P15 | Industrial Structures     | CIVIL | EC-PS | 3 | 0 | 0 | 3 | Design of Steel Structure                                     |
| 21 | 34225P10 | Finite Element Techniques | CIVIL | EC-PS | 3 | 0 | 0 | 3 | Structural Analysis   |
| 22 | 34225P12 | Groundwater Engineering   | CIVIL | EC-PS | 3 | 0 | 0 | 3 | Environmental Engineering and Design (Theory And Practicals)  |
| 23 | 34225P04 | Concrete Technology       | CIVIL | EC-PS | 3 | 0 | 0 | 3 | Construction Materials and Techniques (Theory and Practicals) |
| 24 | 34225P19 | Prestressed Concrete      | CIVIL | EC-PS | 3 | 0 | 0 | 3 | Design of Reinforced Concrete Elements                        |
| 25 | 34225P18 | Prefabricated Structures  | CIVIL | EC-PS | 3 | 0 | 0 | 3 | Design of Steel Structures                                    |

### Specialization Electives

#### Structural Engineering

| S. No. | CODE      | COURSE  | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|-----------|---|----------------|----------|---|---|---|---|--------------|
| 1      | 34225SE07 | Structural Mechanics                              | CIVIL          | EC-SE    | 3 | 0 | 0 | 3 | NIL          |
| 2      | 34225SE05 | Introduction to Finite Element Analysis           | CIVIL          | EC-SE    | 3 | 0 | 0 | 3 | NIL          |
| 3      | 34225SE01 | Advanced Concrete Technology                      | CIVIL          | EC-SE    | 3 | 0 | 0 | 3 | NIL          |
| 4      | 34225SE06 | Prestressing Technology in Structural Engineering | CIVIL          | EC-SE    | 3 | 0 | 0 | 3 | NIL          |
| 5      | 34225SE02 | Bridge Engineering                                | CIVIL          | EC-SE    | 3 | 0 | 0 | 3 | NIL          |
| 6      | 34225SE04 | Earthquake Engineering and Structural Dynamics    | CIVIL          | EC-SE    | 3 | 0 | 0 | 3 | NIL          |
| 7      | 34225SE03 | Earthquake Engineering                            | CIVIL          | EC-SE    | 3 | 0 | 0 | 3 | NIL          |

#### AI in Smart Building Technologies

|   |            |  |       |       |   |   |   |   |     |
|---|------------|--|-------|-------|---|---|---|---|-----|
| 1 | 34225AST05 | Integration of AI with Existing Building Management Systems (BMS). | CIVIL | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 2 | 34225AST04 | AI-Assisted Design Tools for Efficient Building Layouts.           | CIVIL | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 3 | 34225AST06 | Sustainable Construction Management Using AI & ML                  | CIVIL | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 4 | 34225AST01 | AI & BIM Enhanced Design and Planning                              | CIVIL | EC-PS | 3 | 0 | 0 | 3 | NIL |

|   |            |   |       |       |   |   |   |   |     |
|---|------------|---|-------|-------|---|---|---|---|-----|
| 5 | 34225AST02 | AI for Sustainability and Green Building Technologies | CIVIL | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 6 | 34225AST03 | AI in Building Maintenance and Smart Infrastructure   | CIVIL | EC-PS | 3 | 0 | 0 | 3 | NIL |

### 3D Printing

| S. No. | CODE      | COURSE   | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|-----------|--|----------------|----------|---|---|---|---|--------------|
| 1      | 342253D01 | 3D Printing with Sketchup                        | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 2      | 342253D06 | Modernistic Approaches in Building Construction  | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 3      | 342253D05 | Fundamentals of 3D Printing                      | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 4      | 342253D07 | Nano Materials for 3D Printing                   | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 5      | 342253D04 | BIM and 3D Printing of Concrete                  | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 6      | 342253D03 | Advanced 3D Printing Application in Construction | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 7      | 342253D02 | Additive Manufacturing Techniques                | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 8      | 342253D81 | Measurement Science In 3D Printing               | CIVIL          | EC-PS    | 0 | 0 | 4 | 2 | NIL          |

### Environmental Engineering

| S. No. | CODE      | COURSE   | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|-----------|--|----------------|----------|---|---|---|---|--------------|
| 1      | 34225EE01 | Environmental Impact Assessment                      | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 2      | 34225EE04 | Instrumental Monitoring of Environment               | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 3      | 34225EE03 | Indoor Air Quality                                   | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 4      | 34225EE02 | Environmental Policies and Legislations              | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 5      | 34225EE06 | Sustainable Development and Environment              | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 6      | 34225EE05 | Remote Sensing and GIS for Environmental Application | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 7      | 34225EE07 | Waste Water Management                               | CIVIL          | EC-PS    | 3 | 0 | 0 | 3 | NIL          |
| 8      | 34225EE81 | Environmental Analysis Laboratory                    | CIVIL          | EC-PS    | 0 | 0 | 4 | 2 | NIL          |

| <b>Industry Designed / Industry supported / Industry offered/Industry Sponsored Courses (3-9)</b> |          |   |   |          |   |   |   |   |              |
|---|----------|---|---|----------|---|---|---|---|--------------|
| S. No.  | CODE     | COURSE                                    | OFFERING DEPT.                                    | CATEGORY | L | T | P | C | PREREQUISITE |
| 1   | 34125I26 | Soft Skills                               | CSE//INFOSYS                                      | EC-IE    | 3 | 0 | 0 | 3 | NIL          |
| 2   | 34125I16 | Green Buildings and Built Environment     | Civil/IGBC  | EC-IE    | 3 | 0 | 0 | 3 | NIL          |
| 3   | 34125I24 | Paint Technology and Applications         | Civil/ Paints and coatings skill council          | EC-IE    | 3 | 0 | 0 | 3 | NIL          |
| <b>Vocational Skill Development Courses (2)</b>   |          |   |   |          |   |   |   |   |              |
| S. No.  | CODE     | COURSE                                    | OFFERING DEPT.                                    | CATEGORY | L | T | P | C | PREREQUISITE |
| 1   | 34225V81 | AUTOCAD For Civil Drafting                | CIVIL   | EC-VSD   | 0 | 0 | 2 | 1 | NIL          |
| 2   | 34225V83 | Plumbing & Sanitation System Design       | CIVIL   | EC-VSD   | 0 | 0 | 2 | 1 | NIL          |
| 3   | 34225V82 | Construction Safety & Site Management     | CIVIL   | EC-VSD   | 0 | 0 | 2 | 1 | NIL          |
| 4   | 34225V84 | Quantity Surveying & Estimation           | CIVIL   | EC-VSD   | 0 | 0 | 2 | 1 | NIL          |
| <b>Open Electives</b>   |          |   |   |          |   |   |   |   |              |
| <b>Innovation and Entrepreneurship (3 -9)</b>   |          |   |   |          |   |   |   |   |              |
| S. No.  | CODE     | COURSE                                    | OFFERING DEPT.                                    | CATEGORY | L | T | P | C | PREREQUISITE |
| 1   | 34125O05 | Creativity and Innovation Management      | MANAG   | OE-IE    | 3 | 0 | 0 | 3 | NIL          |
| 2   | 34125O08 | Intellectual Property Rights              | MANAG   | OE-IE    | 3 | 0 | 0 | 3 | NIL          |
| 3   | 34125O09 | Product Design & Development              | MANAG   | OE-IE    | 3 | 0 | 0 | 3 | NIL          |
| 4   | 34125O07 | Entrepreneurship And New Venture Creation | MANAG<br>Ignite 5.0 course by Wadhvani foundation | OE-IE    | 3 | 0 | 0 | 3 | NIL          |
| <b>Interdisciplinary Open Electives (3-9)</b>   |          |   |   |          |   |   |   |   |              |
| S. No.  | CODE     | COURSE                                    | OFFERING DEPT.                                    | CATEGORY | L | T | P | C | PREREQUISITE |
| 1   | 35025O01 | Body Area Networks                        | BME   | OE- EA   | 3 | 0 | 0 | 3 | NIL          |
| 2   | 35325O02 | Fundamentals of Biomedical Engineering    | BME   | OE- EA   | 3 | 0 | 0 | 3 | NIL          |
| 3   | 35325O03 | Telehealth Technology                     | BME   | OE- EA   | 3 | 0 | 0 | 3 | NIL          |
| 4   | 38125O01 | Biofertilizer Technology                  | BTE   | OE- EA   | 3 | 0 | 0 | 3 | NIL          |

|    |          |   |       |        |   |   |   |   |     |
|----|----------|---|-------|--------|---|---|---|---|-----|
| 5  | 38125002 | Food Science and Industry 4.0                           | BTE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 6  | 38125003 | Introduction To Biofuels                                | BTE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 7  | 35025001 | Cyber Security  | CSE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 8  | 35025003 | Fundamental of Machine Learning                         | CSE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 9  | 35025002 | Data Science for Professionals                          | CSE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 10 | 34725002 | Digital Image Processing & Pattern Generation           | ECE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 11 | 34725003 | Evolution of Mobile Communication 1G To 5G              | ECE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 12 | 34725004 | Principles of Radar and Satellite Communication         | ECE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 13 | 34425001 | 3D Printing and its Applications                        | MECH  | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 14 | 34425002 | Energy Harvesting and Renewable Energy Systems          | MECH  | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 15 | 34425003 | Industrial Robotics                                     | MECH  | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 16 | 36925002 | Biopharmaceutics  | PCE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 17 | 36925003 | Functional Foods & Nutraceuticals                       | PCE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 18 | 36925001 | Biomolecules  | PCE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 19 | 34625002 | IOT Systems: An Introduction to Sensors and Transducers | EEE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 20 | 34625003 | Smart Cities: Electrical Systems and Technologies       | EEE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 21 | 34625001 | Energy Conservation and Management                      | EEE   | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 22 | 34125002 | Total Quality Management                                | MANAG | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 23 | 34125001 | Engineering Management and Ethics                       | MANAG | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 24 | 34125003 | Management Principles for Engineers                     | MANAG | OE- EA | 3 | 0 | 0 | 3 | NIL |

**Special Electives (3)**

| S. No. | CODE | COURSE | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|------|--------|----------------|----------|---|---|---|---|--------------|
|--------|------|--------|----------------|----------|---|---|---|---|--------------|

|   |          |                                  |       |        |   |   |   |   |     |
|---|----------|----------------------------------|-------|--------|---|---|---|---|-----|
| 1 | 34125L01 | Lean Six Sigma                   | MANAG | OE- SP | 3 | 0 | 0 | 3 | NIL |
| 2 | 34125L02 | Project Management and Team Work | MANAG | OE- SP | 3 | 0 | 0 | 3 | NIL |

### University Open Electives (1)

| S. No. | CODE     | COURSE  | OFFERING DEPT.                         | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|----------|---|--|----------|---|---|---|---|--------------|
| 1      | 40625U01 | Dental Hygiene & Quality of Life                  | DENTISTRY                              | EC - UOE | 1 | 0 | 0 | 1 | NIL          |
| 2      | 40625U02 | Nutrition for Wellness & Specific Diseases        | NURSING                                | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 3      | 40625U03 | Fundamentals of Homoeopathy                       | HOMOEOPATHY                            | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 4      | 40625U04 | Advertising                                       | ARTS & SCIENCE                         | EC - UOE | 1 | 0 | 0 | 1 | NIL          |
| 5      | 40625U05 | Teamwork & Collaboration                          | ARTS & SCIENCE                         | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 6      | 40625U06 | Emotional Intelligence                            | ARTS & SCIENCE                         | EC - UOE | 1 | 0 | 0 | 1 | NIL          |
| 7      | 40625U07 | Media Management                                  | ARTS & SCIENCE                         | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 8      | 40625U08 | Exercise Essentials for Physical Fitness          | PHYSIOTHERAPY                          | EC – UOE | 0 | 0 | 2 | 1 | NIL          |
| 9      | 40625U06 | Essential Skills for Medical Emergencies          | MEDICINE                               | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 10     | 40625U10 | Medicine Plants in Disease Management             | PHARMACY                               | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 11     | 40625U11 | Basic Life Support                                | ALLIED HEALTH SCIENCES                 | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 12     | 40625U12 | Mallarkhambam                                     | PHYSICAL EDUCATION                     | EC – UOE | 0 | 0 | 2 | 1 | NIL          |
| 13     | 40625U13 | Silambam  | PHYSICAL EDUCATION                     | EC – UOE | 0 | 0 | 2 | 1 | NIL          |
| 14     | 40625U14 | Basic Fitness Training                            | PHYSICAL EDUCATION                     | EC – UOE | 0 | 0 | 2 | 1 | NIL          |
| 15     | 40625U15 | Recreational Games                                | PHYSICAL EDUCATION                     | EC – UOE | 0 | 0 | 2 | 1 | NIL          |
| 16     | 40625U16 | Introduction to Law                               | LAW                                    | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 17     | 40625U17 | Fundamentals of Law in Technology and Cyber Space | LAW                                    | EC – UOE | 1 | 0 | 0 | 1 | NIL          |
| 18     | 40625U18 | Foundation Course in Yoga                         | REHABILITATION AND BEHAVIORAL SCIENCES | EC – UOE | 1 | 0 | 0 | 1 | NIL          |

|    |  |   |  |          |   |   |   |   |     |
|----|--|---|--|----------|---|---|---|---|-----|
| 19 | 40625U19   | Introduction to Psychology  | REHABILITATION AND BEHAVIORAL SCIENCES | EC – UOE | 1 | 0 | 0 | 1 | NIL |
| 20 | 40625U20   | Introduction to Public Policy and Governance  | LIBERAL ARTS                           | EC – UOE | 1 | 0 | 0 | 1 | NIL |
| 21 | 40625U21   | Indian Economy and Development Challenges   | LIBERAL ARTS                           | EC – UOE | 1 | 0 | 0 | 1 | NIL |
| 22 | Course Code will be given after receiving SWAYAM Certificate | Any SWAYAM / MOOC / NPTEL Courses which are not related to the discipline of study of the student can be chosen as an Open Elective in Consultation with the respective Faculty Advisor of the Institution. |  | EC - UOE | 1 | 0 | 0 | 1 | NIL |

#### D. Indian Knowledge Systems (2)

| S. No. | CODE     | COURSE                   | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|----------|--------------------------|----------------|----------|---|---|---|---|--------------|
| 1      | 34225K01 | Indian Knowledge Systems | ENG            | IKS      | 2 | 0 | 0 | 2 | NIL          |

#### E. Design Thinking (2)

| S. No. | CODE     | COURSE                                       | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|----------|--|----------------|----------|---|---|---|---|--------------|
| 1      | 34225D01 | Design Thinking and Advanced Problem Solving | HCL            | DT       | 1 | 0 | 0 | 1 | NIL          |

#### F. Courses for Presentation of technical Skills related to the Specialization (11)

| S. No. | CODE     | COURSE       | OFFERING DEPT. | CATEGORY | L | T | P  | C | PREREQUISITE |
|--------|----------|--------------|----------------|----------|---|---|----|---|--------------|
| 1      | 34225R01 | Project Work | CIVIL          | PI-P     | 0 | 0 | 16 | 8 | NIL          |
| 2      | 34225M01 | Mini Project | CIVIL          | PI-M     | 0 | 0 | 6  | 3 | NIL          |

#### \*\*G. Mandatory Courses (5)

| S. No. | CODE     | COURSE                 | OFFERING DEPT. | CATEGORY | L | T | P | C | PREREQUISITE |
|--------|----------|------------------------|----------------|----------|---|---|---|---|--------------|
| 1      | 34225Z82 | Research Methodology   | CIVIL          | MC       | 0 | 0 | 2 | 1 | NIL          |
| 2      | 34125Z01 | Environmental Sciences | CHEM           | MC       | 0 | 0 | 2 | 1 | NIL          |
| 3      | 34125Z81 | Indian Constitution    | LAW            | MC       | 0 | 0 | 2 | 1 | NIL          |
| 4      | 34125Z82 | Yoga and Mediation     | PHED           | MC       | 0 | 0 | 2 | 1 | NIL          |

| <b>Minor Degree</b>                            |             |  |                       |                 |          |          |          |          |                     |
|--|-------------|--|-----------------------|-----------------|----------|----------|----------|----------|---------------------|
| <b>Sustainable Construction and Management</b> |             |  |                       |                 |          |          |          |          |                     |
| <b>S. No.</b>                                  | <b>CODE</b> | <b>COURSE</b>                                  | <b>OFFERING DEPT.</b> | <b>CATEGORY</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> | <b>PREREQUISITE</b> |
| 1  | 34225G05    | Renewable Energy Systems                       | CIVIL                 | HMD             | 3        | 0        | 0        | 3        | NIL                 |
| 2  | 34225G07    | Thermal Insulation Installation                | CIVIL                 | HMD             | 3        | 0        | 0        | 3        | NIL                 |
| 3  | 34225G06    | Sustainable Urban Systems                      | CIVIL                 | HMD             | 3        | 0        | 0        | 3        | NIL                 |
| 4  | 34225G01    | Energy Auditing in Special Structures          | CIVIL                 | HMD             | 3        | 0        | 0        | 3        | NIL                 |
| 5  | 34225G04    | Life Cycle Assessment for Complex Systems      | CIVIL                 | HMD             | 3        | 0        | 0        | 3        | NIL                 |
| 6  | 34225G03    | Infrastructure Project Development             | CIVIL                 | HMD             | 3        | 0        | 0        | 3        | NIL                 |
| 7  | 34225G02    | Green Building and Energy Efficient Building   | CIVIL                 | HMD             | 3        | 0        | 0        | 3        | NIL                 |
| 8  | 34225G81    | Sustainable Building Material Laboratory       | CIVIL                 | HMD             | 0        | 0        | 4        | 2        | NIL                 |
| <b>Micro Credential</b>                        |             |  |                       |                 |          |          |          |          |                     |
| <b>S. No.</b>                                  | <b>CODE</b> | <b>COURSE</b>                                  | <b>OFFERING DEPT.</b> | <b>CATEGORY</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> | <b>PREREQUISITE</b> |
| 1  | 34225J01    | Non-destructive testing (NDT) of structures    | CIVIL                 | MCC             | 1        | 0        | 2        | 2        | NIL                 |
| 2  | 34225J02    | Structural health monitoring                   | CIVIL                 | MCC             | 1        | 0        | 2        | 2        | NIL                 |
| 3  | 34225J03    | Environmental Impact & Carbon Footprint Basics | CIVIL                 | MCC             | 1        | 0        | 2        | 2        | NIL                 |

**SKILL DEVELOPMENT COURSES**

| <b>S. No.</b> | <b>CODE</b> | <b>COURSE</b>                                  | <b>OFFERING DEPT.</b> | <b>CATEGORY</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> | <b>PREREQUISITE</b> |
|---------------|-------------|--|-----------------------|-----------------|----------|----------|----------|----------|---------------------|
| 1             | 34225S83    | Plumbing Systems and Sanitary Fittings         | CIVIL                 | SDC             | 0        | 0        | 4        | 2        | NIL                 |
| 2             | 34225S82    | Engineering Drawing & AutoCAD Basics           | CIVIL                 | SDC             | 0        | 0        | 4        | 2        | NIL                 |
| 3             | 34225S04    | Fundamentals of Masonry Works                  | CIVIL                 | SDC             | 2        | 0        | 0        | 2        | NIL                 |
| 4             | 34225S01    | Building Safety and Construction Practices     | CIVIL                 | SDC             | 2        | 0        | 0        | 2        | NIL                 |
| 5             | 34225S81    | Computer-Aided Drafting and 3D Modelling       | CIVIL                 | SDC             | 0        | 0        | 4        | 2        | NIL                 |
| 6             | 34225S02    | Construction Estimation and Billing            | CIVIL                 | SDC             | 2        | 0        | 0        | 2        | NIL                 |
| 7             | 34225S03    | Construction Tools, Equipment, and Site Safety | CIVIL                 | SDC             | 2        | 0        | 0        | 2        | NIL                 |
| 8             | 34225S84    | Surveying Instruments and Measurements         | CIVIL                 | SDC             | 0        | 0        | 4        | 2        | NIL                 |