

## COURSE LIST - DEPARTMENT OF CIVIL ENGINEERING

### 1<sup>st</sup> Semester

| Course Code | Course Title   | Course Number |
|-------------|--|---------------|
| CHCE0027    | Engineering Chemistry                                | 1.1           |
| MACL0012    | Mathematics I - Calculus and Linear Algebra          | 1.2           |
| EEBE0038    | Basic Electrical Engineering                         | 1.3           |
| CHCE6007    | Engineering Chemistry Lab                            | 1.4           |
| EEBL6027    | Basic Electrical Engineering Laboratory              | 1.5           |
| MNWM6023    | Workshop/Manufacturing Practice                      | 1.6           |
| BTIP7       | Student Induction Program - Universal Human Values I |               |

### 2<sup>nd</sup> Semester

| Course Code | Course Title  | Course Number |
|-------------|---|---------------|
| PSEP0039    | Engineering Physics: Mechanics  | 2.1           |
| MAIN0013    | Mathematics II-Multiple Integrals, Numerical Methods and Differential Equations | 2.2           |
| CSPS0079    | Programming for Problem Solving   | 2.3           |
| EGEH0111    | English   | 2.4           |
| PSEG6017    | Physics Lab for Engineers   | 2.5           |
| CVED6024    | Engineering Graphics and Design   | 2.6           |
| EGOC6005    | Oral Communication Practice Lab   | 2.7           |
| CSPL6069    | Programming for Problem Solving Lab   | 2.8           |
| EDCI0100    | Constitution of India   |               |
| BTIP9       | Student Induction Program   |               |

### 3<sup>rd</sup> Semester

| Course Code | Course Title   | Course Number |
|-------------|--|---------------|
| ECBE0051    | Basic Electronics  | 3.1           |
| BOBE0002    | Biology for Engineering                                      | 3.2           |
| MNEM0034    | Engineering Mechanics  | 3.3           |
| CVES0046    | Energy Science and Engineering                               | 3.4           |
| MATD0028    | Mathematics III- Transform Calculus and Discrete Mathematics | 3.5           |
| CVIC0054    | Introduction to Civil Engineering                            | 3.6           |
| ECBE6040    | Basic Electronics Lab  | 3.7           |
| CVCA6025    | Computer Aided Civil Engineering Drawing Lab                 | 3.8           |
| BTIA8       | Internship Activity  | 3.9           |
| BTIP910     | Student Induction Program- Universal Human Values II         | 3.10          |

### 4<sup>th</sup> Semester

| Course Code | Course Title   | Course Number |
|-------------|--|---------------|
| MNME0041    | Elements of Mechanical Engineering   | 4.1           |
| CVIS0053    | Instrumentation and Sensor Technologies for Civil Engineering Applications   | 4.2           |
| CVEG0047    | Engineering Geology  | 4.3           |
| CVDP0048    | Disaster Preparedness & Planning   | 4.4           |
| CVFM0049    | Introduction to Fluid Mechanics  | 4.5           |
| CVSM0050    | Introduction to Solid Mechanics  | 4.6           |
| CVSG0051    | Surveying & Geomatics  | 4.7           |
| CVMT0052    | Materials, Testing and Evaluation  | 4.8           |
| CVSG0055    | Civil Engineering - Societal & Global Impact                                 | 4.9           |
| CVIS6031    | Instrumentation & Sensor Technologies for Civil Engineering Applications Lab | 4.10          |
| CVEG6026    | Engineering Geology Lab  | 4.11          |

|          |                                       |      |
|----------|---------------------------------------|------|
| CVFM6027 | Introduction to Fluid Mechanics Lab   | 4.12 |
| CVSM6028 | Introduction to Solid Mechanics Lab   | 4.13 |
| CVSG6029 | Surveying & Geomatics Lab             | 4.14 |
| CVMT6030 | Materials, Testing and Evaluation Lab | 4.15 |
| MTOB0086 | Organizational Behaviour              | 4.16 |

**5<sup>th</sup> Semester**

| <b>Course Code</b> | <b>Course Title</b>                     | <b>Course Number</b> |
|--------------------|---|----------------------|
| CVMM0056           | Mechanics of Materials                  | 5.1                  |
| CVHE0057           | Hydraulic Engineering                   | 5.2                  |
| CVSE0058           | Structural Engineering                  | 5.3                  |
| CVGE0059           | Geotechnical Engineering                | 5.4                  |
| CVHW0060           | Hydrology & Water Resources Engineering | 5.5                  |
| CVVE0061           | Environmental Engineering               | 5.6                  |
| CVTE0062           | Transportation Engineering              | 5.7                  |
| MTPP0105           | Professional Practice, Law & Ethics     | 5.8                  |
| CVHE6031           | Hydraulic Engineering Lab               | 5.9                  |
| CVGE6032           | Geotechnical Engineering Lab            | 5.10                 |
| CVVE6033           | Environmental Engineering Lab           | 5.11                 |
| CVTE6034           | Transportation Engineering Lab          | 5.12                 |
| BTIP12             | Internship Seminar                      | 5.13                 |
|                    | Service Learning - Theory               |                      |

### 6<sup>th</sup> Semester

| <b>Course Code</b> | <b>Course Title</b>   | <b>Course Number</b> |
|--------------------|---|----------------------|
| CVCM0063           | Construction Engineering & Management                       | 6.1                  |
| CVEC0064           | Engineering Economics, Estimation & Costing                 | 6.2                  |
| CVCS0065           | Design of Concrete Structures I                             | 6.3                  |
| CVED0066           | Civil Engineering Design I                                  | 6.4                  |
| CVSA0068           | Structural Analysis I                                       | 6.5                  |
| CVGI0070           | Geographic Information Systems and Science                  | 6.6                  |
| CVHS0071           | Soft Skills and Interpersonal Communication                 | 6.7                  |
| CVSS0072           | Design of Steel Structures                                  | 6.8                  |
| CVRS0073           | Repairs and Rehabilitation of Structures                    | 6.9                  |
| CVPT0074           | Physico Chemical Process of Water and Waste Water Treatment | 6.10                 |
| CVRE0075           | Railway Engineering   | 6.11                 |
| CVOC0076           | Open Channel Flow   | 6.12                 |
| CVSM0077           | Soil Mechanics II   | 6.13                 |
| CVEC6035           | Engineering Economics, Estimation & Costing Lab             | 6.14                 |
| BTIP13             | Internship (Survey Camp)                                    | 6.15                 |
|                    | Service Learning – Field Work                               |                      |

### 7<sup>th</sup> Semester

| Course Code | Course Title  | Course Number |
|-------------|---|---------------|
|             | Life Science  | 7.1           |
|             | Design of Concrete Structures II                          | 7.2           |
|             | Irrigation Engineering and Design of Hydraulic Structures | 7.3           |
|             | Prestressed Concrete                                      | 7.4           |
|             | Structural Analysis II                                    | 7.5           |
|             | Port and Harbor Engineering                               | 7.6           |
|             | Environmental Impact Assessment and Life Cycle Analysis   | 7.7           |
|             | Metro Systems and Engineering                             | 7.8           |
|             | Remote Sensing and GIS                                    | 7.9           |
|             | Project-I   | 7.10          |
|             | Industrial Training                                       | 7.11          |

### 8<sup>th</sup> Semester

| Course Code | Course Title  | Course Number |
|-------------|---|---------------|
|             | Bridge Engineering  | 8.1           |
|             | Basics of Computational Hydraulics                                | 8.2           |
|             | Solid and Hazardous Waste Management                              | 8.3           |
|             | Earthquake Engineering  | 8.4           |
|             | Structural Dynamics   | 8.5           |
|             | Structural Analysis by Matrix Methods                             | 8.6           |
|             | Environmental Law and Policy                                      | 8.7           |
|             | Sustainable Engineering and Technology/Economic Policies in India | 8.8           |
|             | Project-II  | 8.9           |
|             | Essence of Indian Traditional Knowledge                           |               |

### Program Outcomes – UG Programmes

- PO1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2. **Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- PO3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9. **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### Program Specific Outcomes – B.Tech Civil Engineering

- PSO 1. **Professional skills:** The ability to analyse and design civil engineering structures as per the provisions in Indian standards and other relevant codes like buildings, bridges, tunnels, highways, railways, airports, docks and harbors, water and sewage treatment plants etc.
- PSO 2. **Problem solving and managerial skills:** The ability to manage large infrastructural projects by making use of latest project management techniques for optimum utilisation of resources.
- PSO 3. **Innovation and entrepreneurship:** Acquire state-of-the-art scientific knowledge and identify solutions to problems in various civil engineering domains that will create new horizons for entrepreneurial ventures.
- PSO 4. **Research and development:** To create an eco-system of research to cater to the needs of society and industrial requirements.

### Mapping of POs, PSOs vs. Courses

| Course | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO1 | PSO2 | PSO3 | PSO4 |
|--------|------|------|------|------|------|------|------|------|------|-------|-------|-------|------|------|------|------|
| 1.1    | H    | L    |      | L    |      | M    | M    |      | M    | M     |       | L     | L    |      |      | M    |
| 1.2    | L    | H    | M    |      | M    | M    |      | M    | H    | M     | M     | M     |      | M    |      | M    |
| 1.3    | M    | M    |      | L    | L    |      |      |      | L    |       |       |       |      | L    | L    |      |
| 1.4    | M    | M    | M    | L    | L    |      | M    |      | L    |       |       | L     | L    |      |      | M    |
| 1.5    | M    | M    |      | L    | L    |      |      |      | L    |       |       |       |      | L    | L    |      |
| 1.6    |      |      |      |      | H    |      |      |      | M    |       |       | H     |      | L    | M    |      |
| 2.1    | H    | M    |      | L    |      | M    | M    |      | M    | M     |       | L     | L    |      |      | M    |
| 2.2    | L    | H    | M    |      | M    | M    |      | M    | H    | M     | M     | M     |      | M    |      | M    |
| 2.3    | L    | M    |      |      | M    |      |      |      |      |       |       |       |      |      |      | M    |
| 2.4    |      |      |      |      |      | L    |      |      | L    | M     |       |       |      |      |      | L    |
| 2.5    | H    | M    |      | L    |      | M    | M    |      | M    | M     |       | L     | L    |      |      | M    |
| 2.6    | L    |      | M    |      | H    |      |      |      |      |       |       |       | M    |      |      |      |
| 2.7    |      |      |      |      |      | L    |      |      | L    | M     |       |       |      |      |      | L    |
| 2.8    | L    | M    |      |      | M    |      |      |      |      |       |       |       |      |      |      | M    |
| 3.1    | M    | M    |      | L    | L    |      |      |      | L    |       |       |       |      | L    | L    |      |
| 3.2    |      |      |      |      |      |      | M    |      |      |       |       |       |      |      |      | L    |
| 3.3    | H    | M    |      | L    |      | M    | L    |      |      |       |       | L     | M    |      | L    |      |
| 3.4    | M    |      | L    |      | M    |      | H    |      |      |       |       | M     |      |      | M    | L    |
| 3.5    | L    | H    | M    |      | M    | M    |      | M    | H    | M     | M     | M     |      | M    |      | M    |
| 3.6    | L    | L    | L    | L    | L    | M    | L    | M    |      |       | M     | L     | L    | M    |      |      |
| 3.7    | M    | M    |      | L    | L    |      |      |      | L    |       |       |       |      | L    | L    |      |
| 3.8    | L    |      | M    |      | H    |      |      |      |      |       |       |       | M    |      |      |      |
| 3.9    | M    | H    | M    | L    | M    | M    | L    | L    | H    | M     | M     | M     | H    | M    |      |      |
| 3.10   |      |      |      |      |      | M    | L    | H    | M    | L     |       | L     |      | L    |      |      |
| 4.1    | H    | M    |      | L    |      | M    | M    |      | M    | M     |       | L     | M    |      | L    |      |
| 4.2    | M    | M    |      | L    | H    |      |      |      | L    |       |       |       |      | L    | L    |      |
| 4.3    | M    |      |      |      |      |      | L    |      |      |       |       | L     | L    | L    |      |      |
| 4.4    |      |      | H    | M    | M    | H    | H    |      | M    | M     |       | M     | M    | M    |      | L    |
| 4.5    | M    | M    |      | L    | L    |      |      |      |      |       |       |       | M    | L    |      | M    |
| 4.6    | H    | M    | M    | L    |      | L    |      |      |      |       |       | L     | M    |      | L    | M    |
| 4.7    | M    |      | L    |      | M    |      |      |      | H    | M     |       |       | H    | M    |      |      |
| 4.8    | M    |      |      |      |      | L    |      |      |      |       |       |       | M    |      | L    | M    |
| 4.9    |      |      |      |      |      | H    | M    |      |      |       | M     |       |      | M    | L    |      |
| 4.10   | M    | M    |      | L    | H    |      |      |      | L    |       |       |       |      | L    | L    |      |
| 4.11   | M    |      |      |      |      |      | L    |      |      |       |       | L     | L    | L    |      |      |
| 4.12   | M    | M    |      | L    | L    |      |      |      |      |       |       |       | M    | L    |      | M    |
| 4.13   | H    | M    | M    | L    |      | L    |      |      |      |       |       | L     | M    |      | L    | M    |
| 4.14   | M    |      | L    |      | M    |      |      |      | H    | M     |       |       | H    | M    |      |      |
| 4.15   | M    |      |      |      |      | L    |      |      |      |       |       |       | M    |      | L    | M    |
| 4.16   |      |      |      |      |      |      |      | H    | H    | M     | M     | L     |      | M    | M    |      |
| 5.1    | H    | M    | M    | L    |      | L    |      |      |      |       |       | L     | M    |      | L    | M    |
| 5.2    | M    | H    |      | L    | M    |      |      |      |      |       |       |       | H    | M    |      | M    |
| 5.3    | M    | H    | M    | M    | L    |      |      |      |      |       |       | L     | M    | M    |      | M    |
| 5.4    | M    | M    | H    |      |      |      | L    |      |      |       |       | L     | M    | M    |      |      |
| 5.5    | H    | H    | M    | M    |      |      | M    |      | M    |       |       | L     | M    | M    |      |      |
| 5.6    | H    | M    | M    |      |      | H    | H    |      |      |       |       | L     | H    |      | M    |      |

|      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.7  | H | M | M |   |   | L |   |   |   |   |   |   | H | M |   |   |
| 5.8  |   |   |   |   |   | L |   | H | M | M | H | M |   | M |   |   |
| 5.9  | M | H |   | L | M |   |   |   |   |   |   |   | H | M |   | M |
| 5.10 | M | M | H |   |   |   | L |   |   |   |   | L | M | M |   |   |
| 5.11 | H | M | M |   |   | H | H |   |   |   |   | L | H |   | M |   |
| 5.12 | H | M | M |   |   | L |   |   |   |   |   |   | H | M |   |   |
| 5.13 |   | M | M | M | H | L | L | L | H | M | M | M | M | H |   | M |
| 6.1  | M |   |   |   | M | M |   | M | H | M | H | L |   | M |   |   |
| 6.2  |   | M |   |   | M |   |   |   |   |   | H |   |   | M |   |   |
| 6.3  | H | M | H | H |   |   |   |   | M |   |   | M | H | H |   |   |
| 6.4  | M | M | H | M | H |   | H |   |   |   |   | L | H |   |   | M |
| 6.5  | M | H | M | H | L |   |   |   |   |   |   | M | H | H |   | M |
| 6.6  | M | M |   |   | H | L |   |   |   |   | L | L | M |   |   | M |
| 6.7  |   |   |   |   |   | M |   | M | H | H | M |   |   | M |   |   |
| 6.8  | H | M | H | H |   |   |   |   | M |   |   | M | H | H |   |   |
| 6.9  | H |   |   |   | H |   | M |   | M |   |   | M | M |   |   | M |
| 6.10 | M | M |   |   | M |   | H |   |   |   |   | M | H |   |   | M |
| 6.11 | M | L |   |   |   | L |   |   |   |   |   |   | H |   |   |   |
| 6.12 | M | M | M | M |   |   |   |   |   |   |   |   | M |   |   | L |
| 6.13 | M | M | H |   |   |   | L |   |   |   |   | L | M | M |   |   |
| 6.14 |   | M |   |   | M |   |   |   |   |   | H |   |   | M |   |   |
| 6.15 |   | M | M | M | H | L | L | L | H | M | M | M | M | H |   | M |
| 7.1  | M |   |   |   |   |   | M |   | H |   |   |   | H |   |   | L |
| 7.2  | H | M | H | H |   |   |   |   | M |   |   | M | H | H |   |   |
| 7.3  | H | H | M | M |   |   | M |   | M |   |   | L | M | H |   |   |
| 7.4  | H | M | H | H |   |   |   |   | M |   |   | M | H | H |   |   |
| 7.5  | M | H | M | H | L |   |   |   |   |   |   | M | H | H |   | M |
| 7.6  | M | L |   |   |   | L |   |   |   |   |   |   | H |   |   |   |
| 7.7  | M | M |   |   | M |   | H |   |   |   |   | M | H |   |   | M |
| 7.8  | M | M | H |   | H | L | L |   |   |   |   |   | H | M |   |   |
| 7.9  | M | M |   |   | M |   | H |   |   |   |   | M | H |   |   | M |
| 7.10 | H | H | H | M | M |   |   |   | H | M |   | H | H |   |   | M |
| 7.11 |   | M | M | M | H | L | L | L | H | M | M | M | M | H |   | M |
| 8.1  | H | M | H | H |   |   |   |   | M |   |   | M | H | H |   |   |
| 8.2  | M | M | M | M | H |   |   |   |   |   |   |   | M |   |   | M |
| 8.3  | L |   | M |   |   | M | M |   |   |   | H | L | M |   |   |   |
| 8.4  | M | H |   |   |   | M | M |   |   |   |   | M | H |   |   | M |
| 8.5  | M | H | M | H | L |   |   |   |   |   |   | M | H | H |   | M |
| 8.6  | M | H | M | H | L |   |   |   |   |   |   | M | H | H |   | M |
| 8.7  |   |   | L |   |   | M | H | H | L | M | L | M |   | M |   | H |
| 8.8  | M |   |   | L |   | M | H | M | M | M | L | M |   | H |   | M |
| 8.9  | H | H | H | M | M |   |   |   | H | M |   | H | H |   |   |   |