

B.Tech. In Civil Engineering Sem. VII & VIII

Academic Evaluation Scheme

Year 2020-21

Sardar Patel College of Engineering Andheri (West), Mumbai 400 058

Scheme for Final Year B.Tech.in Civil Engineering, (Semester - VII) Academic Year 2020-21

| Sr. No | Course Name | Code | Course Plan per Week (Hrs) | | | Credits | In semester Evaluation (Points) | | End Semester Evaluation (Points) | | End semester weightage (%) | Term work/Practical | Total Points |
|--|---|------------------------------|----------------------------|---------------------|----------|-----------|---------------------------------|------|----------------------------------|------------|----------------------------|---------------------|--------------|
| | | | L | P | T | | T-I | T-II | Points | Time (Hrs) | | | |
| Core Courses | | | | | | | | | | | | | |
| 1 | Design of concrete structures | PC-BTC701 | 3 | 0 | 1 | 4 | 20 | 20 | 100 | 3 | 60% | 25# | 125 |
| 2 | Professional Elective IV | Refer Elective IV Table | 3 | 0 | 0 | 3 | 20 | 20 | 100 | 3 | 60% | 0 | 100 |
| 3 | Professional Elective V | Refer Elective V Table | 3 | 0 | 0 | 3 | 20 | 20 | 100 | 3 | 60% | 0 | 100 |
| 4 | Open Elective II | Refer Open Elective II Table | 3 | 0 | 0 | 3 | 20 | 20 | 100 | 3 | 60% | 0 | 100 |
| 5 | Project-Stage I | PROJ-BTC751 | 0 | (2+6) ^{\$} | 0 | 4 | 0 | 0 | 0 | 0 | 0% | 50###** (Note 9) | 50 |
| Online Courses (Note 5) | | | | | | | | | | | | | |
| 6 | Online Course | OL-BTCxxx | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Value Added Courses (Note 7) | | | | | | | | | | | | | |
| 7 | Environmental Impact Assessment and Mgt. | VA-BTC772 | 2 | 0 | 0 | AU | 20 | 20 | 100 | 3 | 60% | 0 | 100 |
| 8 | Conventional and Nonconventional Materials in Highway Sub-grade | VA-BTC773 | 2 | 0 | 0 | AU | 20 | 20 | 100 | 3 | 60% | 25# | 125 |
| Value Added Non-Technical Courses (Note 12) | | | | | | | | | | | | | |
| 9 | Non-technical value added course | VN-BTXXX | Refer Table-VNT | | | | | | | | | | |
| | TOTAL | | 12 | 8 | 1 | 17 | | | | | | | |

Non-technical value Added Courses-VNT

VN-BT001: Ubuntu

VN-BT002: Performing Arts and Script Writing

VN-BT003: Financial Literacy

VN-BT004: Self Defence Training program

VN-BT005: Yoga health technology for self-management

VN-BT006: Integrated self-management

VN-BT007: Photography

Professional Elective – IV

| Specialization | Sr. No. | Code | Elective |
|-----------------------------|----------------|-------------|---------------------------------------|
| Structures | 1 | PE-BTC721 | Advanced Structural Analysis |
| | 2 | PE-BTC 722 | Structural analysis by Matrix Methods |
| Water Resources | 3 | PE-BTC 731 | Surface Hydrology |
| Environmental Engg. | 4 | PE-BTC 741 | Water and Air quality Modelling |
| Transportation and Geo-Tech | 5 | PE-BTC 761 | Pavement Design & Construction |
| | 6 | PE-BTC 762 | Advanced Foundation Engineering |
| | 7 | PE-BTC 763 | Rock Mechanics |

Professional Elective – V

| Specialization | Sr. No. | Code | Elective |
|-----------------------------|----------------|-------------|--|
| Structures | 1 | PE-BTC 723 | Structural dynamics |
| | 2 | PE-BTC 724 | Advanced Design of Steel Structures |
| Water Resources | 3 | PE-BTC732 | Hydraulic Modelling |
| Environmental Engg | 4 | PE-BTC 742 | Sustainable Engineering and technology |
| | 5 | PE-BTC743 | Industrial Wastewater treatment |
| Construction Management | 6 | PE-BTC 751 | Engineering risk and uncertainty |
| | 7 | PE-BTC752 | Infrastructure Planning and Management |
| Transportation and Geo-Tech | 8 | PE-BTC 764 | Design and Construction of Rigid Pavements |

Open Elective-II

| Sr. No. | Code | Elective |
|----------------|-------------|--|
| 1 | OE-BTC 711 | Economic policies of India |
| 2 | OE-BTC 712 | Entrepreneurship, Innovation and Design Thinking |
| 3 | OE-BTC 713 | Disaster Management and preparedness |
| 4 | OE-BTC 714 | Engineering System and development |
| 5 | OE-BTE 701 | Computer network |
| 6 | OE-BTE 702 | Engineering economics |
| 7 | OE-BTE 703 | Embedded system |
| 8 | OE-BTE 704 | Internet of things |
| 9 | OE-BTM 714 | Introduction to Micro-Electro-Mechanical Systems (MEMS) |
| 10 | OE-BTM 715 | Solar and Wind Technology |
| 11 | OE-BTM 717 | Introduction to Augmented Reality |
| 12 | OE-BTM 718 | Fundamental of Artificial Intelligence (AI) and Machine Learning |

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Notes:

1. Refer (i) Academic rules and regulations (ii) Examination rules and regulations for further details.
2. Laboratory course is considered as a separate head of passing
3. # Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows: i) Attendance in Laboratory/Tutorial = 20%, (ii) Journal= 40%, (iii) Practical Examination (and/or) Mini project (and/or) Quiz (Preferably MCQs based on GATE syllabus) (and/or) Seminar (and/or) Oral (and/or) Industry visit report= 40%.

4.

A) For courses having **2 hours per week lecture / 5 modules:**

| Sr. No. | Examination | Module |
|---------|-------------------|-----------------------------|
| 1 | T – I | Module 1 & Part of Module 2 |
| 2 | T – II | Part of Module 2 & Module 3 |
| 3 | Final Examination | Module 1 to 5 |

B) For courses having **3 hours per week lecture / 7 modules:**

| Sr. No. | Examination | Module |
|---------|-------------------|---------------|
| 1 | T – I | Module 1 ,2 |
| 2 | T – II | Module 3, 4 |
| 3 | Final Examination | Module 1 to 7 |

5. Student can opt for an online course available on <https://swayam.gov.in/> or <https://onlinecourses.nptel.ac.in/> and inform department by filling up registration form. After successful completion of the course and approval from the department UG committee, the course title can appear on the grade card of the student.
6. The Mandatory courses are with Pass (P) and No Pass (NP) grades.
7. Department will offer the Value Added courses in a semester subject to availability of resources and enrolment of minimum 20 students opting for the course. Upon successful completion of the Value Added course, the grade of the course will appear in the grade card of the student
8. List of Professional Elective Courses being offered by department in a semester will be selected from Table professional elective IV and V and the list of elective courses being offered by department will be displayed at the beginning of semester.
9. Semester VII: \$ For Project course: contact hours = 2 and self-learning hours =6 ; For project course, in-semester evaluation shall include one or more in-semester presentations **25 points for report and ## 25 points for presentation and viva voce examined by supervisor and one internal examiner
10. The contents of core courses are aligned with the latest GATE syllabus. The mapping between GATE syllabus topics and core courses is given in Table GATE-MAP. The term work for these courses shall include evaluations along the pattern of GATE examinations, for example, part of the term work shall consist of MCQ similar to GATE examinations. GATE-MAP table is given at the end of final year B.Tech-Civil Engg. Credit System .
11. The course contents, wherever appropriate, should include assessment based on Project Based Learning and a report of visit to an industry related to the course.
12. Students can optionally opt for Non-Technical Value Added courses offered by Center for Continuing Education (CCE-SPCE). These courses are with zero credit and upon successful completion, the course titles will appear on student's grade card.

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Courses Offered for Final Year B.Tech. in Civil Engineering (Semester - VIII)
Academic Year 2020-21

| Sr. No. | Course Name | Code | Course Plan per Week (Hrs) | | | Credits | In semester Evaluation (Points) | | End Semester Evaluation (Points) | | End semester weightage (%) | Term work/Practical | Total Points |
|--|--|-------------------------------|----------------------------|-----------|----------|-----------|---------------------------------|------|----------------------------------|------------|----------------------------|---------------------|--------------|
| | | | L | P | T | | T-I | T-II | Points | Time (Hrs) | | | |
| Core Courses | | | | | | | | | | | | | |
| 1 | Engineering Economics Estimation and Costing | PC-BTC801 | 3 | 0 | 1 | 4 | 20 | 20 | 100 | 3 | 60% | 25# | 125 |
| 2 | Elective VI | Refer Elective VI Table | 3 | 0 | 0 | 3 | 20 | 20 | 100 | 3 | 60% | 0 | 100 |
| 3 | Elective VII | Refer Elective VII Table | 2 | 0 | 0 | 2 | 20 | 20 | 100 | 3 | 60% | 0 | 100 |
| 4 | Open Elective III | Refer Open Elective III Table | 3 | 0 | 0 | 3 | 20 | 20 | 100 | 3 | 60% | 0 | 100 |
| 5 | Project –Stage II* | PROJ-BTC851 | 0 | (2+12) \$ | 0 | 7 | 0 | 0 | 0 | 0 | 0% | 100###**(Note 9) | 100 |
| Online Courses (Note 5) | | | | | | | | | | | | | |
| 8 | Online Course | OL-BTCxxx | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Value Added Courses (Note 7) | | | | | | | | | | | | | |
| 15 | Low Cost Rural Roads | VA-BTC873 | 2 | 0 | 1 | AU | 20 | 20 | 100 | 3 | 60% | 25# | 125 |
| Value Added Non-Technical Courses (Note12) | | | | | | | | | | | | | |
| 18 | Refer Table-VNT | VN-BTxxx | Refer Table-VNT | | | | | | | | | | |
| | TOTAL | | 11 | 14 | 1 | 19 | | | | | | | |

Non-technical Value Added Courses-VNT

- VN-BT001: Ubuntu
 VN-BT002: Performing Arts and Script Writing
 VN-BT003: Financial Literacy
 VN-BT004: Self Defence Training program
 VN-BT005: Yoga health technology for self-management
 VN-BT006: Integrated self-management
 VN-BT007: Photography

Professional Elective – VI

| Specialization | Sr. No. | Code | Elective |
|-----------------------------|----------------|-------------|--|
| Structures | 1 | PE-BTC821 | Earthquake Engineering |
| | 2 | PE-BTC822 | Bridge Engineering |
| | 3 | PE-BTC 823 | Decision and Risk analysis |
| Water Resources | 4 | PE-BTC831 | Introduction to Offshore Engineering |
| Environmental Engg | 5 | PE-BTC841 | Environmental Impact assessment |
| Construction Management | 6 | PE-BTC 851 | Construction Productivity & Cost analysis |
| | 7 | PE-BTC 852 | Contracts Management |
| Transportation and Geo-Tech | 8 | PE-BTC 861 | Conventional and Nonconventional Materials in Highways |
| | 9 | PE-BTC862 | Soil Dynamics |

Professional Elective – VII

| Specialization | Sr. No. | Code | Elective |
|-----------------------------|----------------|-------------|---|
| Structures | 1 | PE-BTC824 | Finite Element Analysis |
| | 2 | PE-BTC825 | Advanced structural mechanics |
| Water Resources | 4 | PE-BTC832 | Water Resources Economics Planning and Management |
| Environmental Engg | 5 | PE-BTC842 | Environmental Law and Policy |
| Construction Management | 6 | PE-BTC853 | Valuation and Value Engineering |
| | 7 | PE-BTC854 | Risk and Disaster management |
| Transportation and Geo-Tech | 8 | PE-BTC863 | Transportation Planning and Economics |

Open Elective-III

| Sr. No. | Code | Elective |
|---------|------------|---|
| 1 | OE-BTC 811 | Mechanics of water waves |
| 2 | OE-BTC 812 | Human Resource Development& Organizational Behavior |
| 3 | OE-BTC 813 | Watershed Development & Management |
| 4 | OE-BTC814 | Disaster Management and preparedness |
| 5 | OE-BTE801 | Robotics |
| 6 | OE-BTE802 | Power Plant Engineering |
| 7 | OE-BTE803 | Electrical engineering materials |
| 8 | OE-BTE804 | Medical Electronics |
| 9 | OE-BTE805 | Image processing |
| 10 | OE-BTM712 | Introduction to Research Methodology |
| 11 | OE-BTM719 | Value Engineering |

Notes:

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4. A) For courses having **2 hours per week lecture / 5 modules:**

| Sr. No. | Examination | Module |
|---------|-------------------|-----------------------------|
| 1 | T – I | Module 1 & Part of Module 2 |
| 2 | T – II | Part of Module 2 & Module 3 |
| 3 | Final Examination | Module 1 to 5 |

- B) For courses having **3 hours per week lecture / 7 modules:**

| Sr. No. | Examination | Module |
|---------|-------------|-------------|
| 1 | T – I | Module 1 ,2 |

| | | |
|---|-------------------|---------------|
| 2 | T – II | Module 3, 4 |
| 3 | Final Examination | Module 1 to 7 |

5. Student can opt for an online course available on <https://swayam.gov.in/> or <https://onlinecourses.nptel.ac.in/> and inform department by filling up registration form. After successful completion of the course and approval from the department UG committee, the course title can appear on the grade card of the student.
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8. List of Professional Elective Courses being offered by department in a semester will be selected from Table Professional elective VI and VII and the list of elective courses being offered by department will be displayed at the beginning of semester.
9. Semester VIII: \$ For Project course: contact hours = 2 and self-learning hours = 12 ; For project course, in-semester evaluation shall include one or more in- semester presentations **50 points for report and ## 50 points for presentation and viva voce examined by supervisor and one internal examiner.
10. The contents of core courses are aligned with the latest GATE syllabus. The mapping between GATE syllabus topics and core courses is given in Table GATE-MAP. The term work for these courses shall include evaluations along the pattern of GATE examinations, for example, part of the term work shall consist of MCQ similar to GATE examinations. GATE-MAP table is given at the end of final year B.Tech-Civil Engg. Credit System .
11. The course contents, wherever appropriate, should include assessment based on Project Based Learning and a report of visit to an industry related to the course.
12. Students can optionally opt for Non-Technical Value Added courses offered by Center for Continuing Education (CCE-SPCE). These courses are with zero credit and upon successful completion, the course titles will appear on student's grade card.

Table GATE-MAP: Alignment of Course Content with GATE Syllabus (2021)

B.Tech. in Civil Engineering

| No. | Section | Core courses in SPCE Curriculum 2020-21 | Topics From GATE Syllabus (2021) |
|-----|---------|--|--|
| 1 | S | Engg. Mechanics I- Engg. Mechanics II- | Engineering Mechanics |
| 2 | S | Mechanics of Materials | Solid Mechanics |
| 3 | S | Structural Mechanics | Structural Analysis |
| 4 | S | Structural Engineering | |
| 5 | S | Building Materials and Construction | Construction Materials and Management |
| 6 | | Concrete Technology | |
| 7 | | Construction Engineering & Management | |
| 8 | | Quantity Survey, Estimation and Valuation | |
| 9 | S | Design of RCC Elements (Limit State Method) | Concrete Structures |
| 10 | S | Design and Drawing of Reinforced Concrete Structures | |
| 11 | S | Design of Steel Structures | Steel Structures |
| 12 | G | Soil Mechanics | Soil Mechanics |
| 13 | G | Foundation Engineering | Foundation Engg |
| 14 | W | Fluid Mechanics | Fluid Mechanics |
| 15 | W | Hydraulic Engineering | Hydraulics |
| 16 | W | Hydrology & Water Resources Engineering | Hydrology |
| 17 | W | Water Resources Engineering | Irrigation |
| 18 | E | Environmental Engineering-I | Water and Waste Water |
| 19 | E | Environmental Engineering-II | Air Pollution |
| 20 | E | Environmental Engineering-I & II | Municipal Solid Waste |
| 21 | E | | Noise Pollution |
| 22 | T | Transportation Engineering | Transportation Infrastructure |
| 23 | T | Highway Engineering | Highway Pavements |
| 24 | T | Highway Engineering | Traffic Engineering |
| 25 | G | Basics of Surveying | Principles of surveying |
| 26 | G | Surveying & Geomatics | Photogrammetry |
| 27 | MATH | Applied Mathematics, I, II, III, IV | Linear Algebra, Calculus, Differential Equations, Complex variables, Probability and Statistics, Numerical Methods |

Note:Sections are: S - Structural Engg, G-Geotechnical Engg, W-Water Resource Engg, E-Environmental Engg., T-Transportation Engg, G-Geomatics Engg., MATH - Engineering Mathematics