**MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI**

Diploma Programme in **Civil Engineering**

**I – Scheme**

Programme Structure

**Programme Educational Objectives (PEOs)** *(What s/he will continue to do even after 3-5 years of working in the industry*)

PEO 1. Provide socially responsible, environment friendly solutions to Civil engineering related broad-based problems adapting professional ethics.
PEO 2. Adapt state-of-the-art Civil engineering broad-based technologies to work in multi-disciplinary work environments.
PEO 3. Solve broad-based problems individually and as a team member communicating effectively in the world of work.

**Program Outcomes (POs)** given by NBA. *(What s/he will be able to do at the entry point of industry soon after the diploma programme)*

*PO 1.* ***Basic knowledge:*** *Apply knowledge of basic mathematics, sciences and basic engineering to solve the broad-based Civil engineering problems.*
*PO 2.* ***Discipline knowledge:*** *Apply Civil engineering knowledge to solve broad-based Civil engineering related problems.*
*PO 3.* ***Experiments and practice:*** *Plan to perform experiments and practices to use the results to solve broad-based Civil engineering problems.*
*PO 4.* ***Engineering tools:*** *Apply relevant Civil technologies and tools with an understanding of the limitations.*
*PO 5.* ***The engineer and society:*** *Assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to practice in field of Civil engineering.*
*PO 6.* ***Environment and sustainability:*** *Apply Civil engineering solutions also for sustainable development practices in societal and environmental contexts.*
*PO 7.* ***Ethics:*** *Apply ethical principles for commitment to professional ethics, responsibilities and norms of the practice also in the field of Civil engineering.*
*PO 8.* ***Individual and team work:*** *Function effectively as a leader and team member in diverse/ multidisciplinary teams.*
*PO 9.* ***Communication:*** *Communicate effectively in oral and written form.*
*PO 10.* ***Life-long learning:*** *Engage in independent and life-long learning activities in the context of technological changes also in the Civil engineering and allied industry.*

**Program Specific Outcomes (PSOs)** *(What s/he will be able to do in the Civil engineering specific industry soon after the diploma programme)*

PSO 1. **Construction Planning and Designing:** Perform optimal civil engineering construction, planning and designing activities of desired quality at optimal cost.
PSO 2. **Construction Execution and Maintenance:** Execute civil engineering construction and maintenance using relevant materials and equipment.

## Notes for All the Semesters

1. *Every student has to **separately pass** in **End-Semester-Examination (ESE)** for **both theory** and **practical** by securing minimum of 40% marks, (i.e. 30 out of 75, 28 out of 70, 20 out of 50, and 10 out of 25).*

2. ***Progressive Assessment (PA) for Theory** includes Written Exam/micro projects/ Assignment/Quiz/Presentations/attendance according to the nature of the course. The scheme and schedule for progressive assessment should be informed to the students and discussed with them at the start of the term. This scheme should also be informed in writing to the principal of the institute.*

3. *Teachers need to give **marks judiciously for PA of theory and practicals** so that there is always a **reasonable correlation** between the **ESE marks** obtained by the **student** and the **PA marks** given by **respective teachers for the same student**. In case the PA marks in some courses of some students seems to be relatively inflated in comparison to ESE marks, then MSBTE may review the PA records of such students.*

4. *For developing self-directed learning skills, from each course about 15-20% of the topics/sub-topics, which are relatively simpler or descriptive in nature are to be given to the students for self-study and proper learning of these topics should be assured through classroom presentations by students (see implementation guideline for details).*

Programme Code**: ……..** **I - Scheme** Diploma Programme in **Civil Engineering**

**I – Semester**

| Weighted mean score | S. No. and (Rank No.) of Report | Industry Questionnaire S. No. | Course Title | Teaching Scheme/Week | | | Credits (L+T+P) | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Theory | | Practical | | Grand Total |
| | | | | L | T | P | | ESE | PA | ESE | PA | |
| 3.12 | G3(3) | 37 | English (Common to all) | 3 | - | 2+ | 5 | 70 | 30* | 25 | 25 | 150 |
| 2.85 | 17 (9) | 1 | Basic Science (Common to all) Physics | 2 | - | 2 | 4 | 35 | 15* | 25 | 25 | 200 |
| 2.31 | 36(19) | 2 | Chemistry | 2 | - | 2 | 4 | 35 | 15* | 25 | 25 | |
| 2.96 | 12 (7) | 3 | Basic Mathematics (Common to all) | 4 | 2 | - | 6 | 70 | 30* | - | - | 100 |
| 3.27 | G1(1) | 38 | Fundamentals of ICT (Common to all) | 2# | - | 2 | 4 | - | - | 25 | 25~[1] | 50 |
| 2.85<br>2.50 | 19 (9)<br>31(16) | 6<br>9 | Engineering Graphics Mech. Gp.(AE, ME, PT, FG, EE,CE, CH, PS, DC, TC, TX) | 2# | - | 4 | 6 | - | - | 50 | 50~[2] | 100 |
| 2.92 | 15 (8) | 8 | Workshop Practice Mech. Gp.(AE, ME, PT, FG, EE, CE, CH, PS) | - | - | 4 | 4 | - | - | 50 | 50~[2] | 100 |
| **Total** | | | | **15** | **2** | **16** | **33** | **210** | **90** | **200** | **200** | **700** |

***(#):**No theory Exam; **(*):** Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment (5 marks each for Physics and Chemistry) to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs; **(+):** Language Lab Practical **(~):**For the courses having ONLY practical examination, the PA has two parts – marks, for~[1] (i) practical part - 15 marks(60%) (ii) micro-project part - 10 marks (40%) and for~[2] (i) practical part - 30 marks (60%) (ii) micro-project part - 20 marks (40%).*

***Legends***
***L:** Lecture* ***T:** Tutorial* ***P**: Practical* ***ESE**: End Semester Exam* ***PA:** Progressive Assessment*

***Note**: Blue highlights are courses common to all programmes and yellow highlights are courses common with*

| I - Scheme Diploma Programme in **Civil Engineering** **II – Semester** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Weighted mean score** | **S. No. and (Rank No.) of Report** | **Industry Questionnaire S.No.** | **Course Title** | **Teaching Scheme/Week** | | | **Credits (L+T+P)** | **Examination Scheme** | | | | |
| | | | | **L** | **T** | **P** | | **Theory** | | **Practical** | | **Grand Total** |
| | | | | | | | | **ESE** | **PA** | **ESE** | **PA** | |
| 2.96 | 11(7) | 4 | Applied Mathematics (Civil) | 3 | 1! | - | 4 | 70 | 30* | - | - | 100 |
| 2.85 | 17 (9) | 1 | Applied Science Physics | 2 | - | 2 | 6 | 35 | 15* | 25 | 25 | 150 |
| 2.85 | 17 (9) | 2 | Mech Gp.(AE, ME, PT, FG, CE) Chemistry | 2 | - | | | 35 | 15* | | | |
| 3.23 | 4(3) | 5 | Applied Mechanics Mech Gp.(CE, CH, AE, ME, PT, FG) | 3 | 2 | 2 | 7 | 70 | 30* | 25 | 25 | 150 |
| 3.23<br>3.15 | 3(3)<br>7(4) | 10<br>13 | Construction Materials | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| 3.08 | 8(5) | 11 | Basic Surveying | 3 | - | 4 | 7 | 70 | 30* | 50@ | 50 | 200 |
| 3.35<br>2.62 | 1(1)<br>27(14) | 8<br>28 | Civil Engg Workshop and Practice | - | - | 4 | 4 | - | - | 50 | 50~[2] | 100 |
| 3.12 | G3(3) | 37 | Business Communication Using Computers (Common to all) | 2$ | - | - | 2 | 35$ | 15 | - | - | 50 |
| **Total** | | | | **18** | **3** | **14** | **35** | **385** | **165** | **175** | **175** | **900** |

***(!):*** *From time table point of view, Tutorial for Applied Mathematics and Applied Mechanics of 2 periods each organized in alternate weeks;* ***($)****:Online Exam;.* ***(*):*** *Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment (5 marks each for Physics and Chemistry) to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs;* ***(~[2]):*** *For the courses having ONLY practical examination, the PA has two parts (i) practical part - 30 marks (ii) micro-project part - 20 marks; @: with external examiner.*

| Programme Code**: ……..** **I - Scheme** Diploma Programme in **Civil Engineering** **III – Semester** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Weighted mean score** | **S. No. and(Rank No.) of Report** | **Industry Questionnaire S.No.** | **Course Title** | **Teaching Scheme/Week** | | | **Credits (L+T+P)** | **Examination Scheme** | | | | |
| | | | | **L** | **T** | **P** | | **Theory** | | **Practical** | | **Grand Total** |
| | | | | | | | | **ESE** | **PA** | **ESE** | **PA** | |
| 3.08 | 8(5) | 11 | Advanced Surveying | 4 | - | 4 | 8 | 70 | 30* | 50 | 50 | 200 |
| 2.92 | 13(8) | 25 | Highway Engineering | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| 2.62 | 28(14) | 16 | Mechanics of Structures | 3 | 2 | 2 | 7 | 70 | 30* | 25 | 25 | 150 |
| 3.35 | 1(3) | 12 | Building Construction | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| 3.15 | 6(4) | 22 | Concrete Technology | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| 3.35 | 1(1) | 8 | Computer Aided Drawing | - | - | 4 | 4 | - | - | 50 | 50~[2] | 100 |
| **Total** | | | | **16** | **2** | **16** | **34** | **350** | **150** | **200** | **200** | **900** |

***(*):*** *Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs;* ***(~[2]):*** *For the courses having ONLY practical examination, the PA has two parts (i) practical part - 30 marks (60%) (ii) micro- project part - 20 marks (40%).*

| Programme Code: …….. | | | I - Scheme Diploma Programme in **Civil Engineering** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IV – Semester** | | | | | | | | | | | | | |
| **Weighted mean score** | **S. No. and (Rank No.) of Report** | **Industry Questionnaire S. No.** | **Course Title** | **Teaching Scheme/Week** | | | **Credits (L+T+P)** | **Examination Scheme** | | | | |
| | | | | **L** | **T** | **P** | | **Theory** | | **Practical** | | **Grand Total** |
| | | | | | | | | **ESE** | **PA** | **ESE** | **PA** | |
| 2.38 | 35(18) | 17 | Hydraulics | 3 | 2 | 2 | 7 | 70 | 30* | 25 | 25 | 150 |
| 2.62 | 28(14) | 16 | Theory of Structures | 4 | 2 | - | 6 | 70 | 30* | - | - | 100 |
| 2.50 | 32(16) | 15 | Railway and Bridge Engineering | 4 | - | - | 4 | 70 | 30* | - | - | 100 |
| 2.58 | 30(15) | 20 | Geo-technical Engineering | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| 3.27<br>3.04 | 2(2)<br>10(6) | 7<br>14 | Building Planning and Drawing | 3 | - | 4 | 7 | 70 | 30* | 50 | 50 | 200 |
| 2.15 | 9(9) | 40 | Entrepreneurship Development (Common to all) | 2**$** | - | 2 | 4 | 50$ | - | 25 | 25~[1] | 100 |
| **Total** | | | | **19** | **4** | **10** | **33** | **400** | **150** | **125** | **125** | **800** |

***($)****: Online Exam;* ***(*):*** *Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs;* ***(~[1]):*** *For the courses having ONLY practical examination, the PA has two parts (i) practical part - 15 marks (60%) (ii) micro- project part - 10 marks (40%).*

***Note***

***a)*** *During Summer Break after* ***IV semester*** *(i.e. between IV and V Semester), Polytechnics would ensure mandatory placement of students for 6 weeks industrial training. Preferably, the industry where students would be placed should be large or medium scale, however if such industries are not available, then students can also be placed in small or very small industries but it should be relevant to the branch or discipline of engineering.* ***This training would be evaluated during V semester.***

***b)*** *The allotment of the group of students and orientation for industrial training shall be done before the end of IV semester.*

***c)*** *Students should prepare report of training, which will be evaluated during V semester.*

| Programme Code: …….. | | | I - Scheme Diploma Programme in **Civil Engineering** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **V – Semester** | | | | | | | | | | | | | |
| **Weighted mean score** | **S. No. and (Rank No.) of Report** | **Industry Questionnaire S.No.** | **Course Title** | **Teaching Scheme/Week** | | | **Credits (L+T+P)** | **Examination Scheme** | | | | |
| | | | | **L** | **T** | **P** | | **Theory** | | **Practical** | | **Grand Total** |
| | | | | | | | | **ESE** | **PA** | **ESE** | **PA** | |
| MSBTE guidelines and industry feedback | | | Industrial Training (during summer break after IV semester) | - | - | 6^ | 6^ | - | - | 75 | 75 | 150 |
| 2.46 | 34(17) | 19 | Water Resource Engineering | 4 | - | 2 | 6 | 70 | 30* | 25 | 25 | 150 |
| 2.65<br>2.69 | 26(13),<br>22(12) | 23<br>27 | Design of Steel and RCC Structures | 4 | 1 | 2 | 7 | 70 | 30* | 25 | 25 | 150 |
| 3.23 | 5(3) | 21 | Estimating, Costing and Valuation | 3 | - | 4 | 7 | 70 | 30* | 50 | 50 | 200 |
| | | | Elective –I | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| 2.46<br>2.85 | 33(17)<br>18(9) | 18<br>36 | Environment and Public Health Engineering | 4 | - | 2 | 6 | 70 | 30* | 25 | 25 | 150 |
| MSBTE guidelines | | | Minor Project (Common to all) | - | - | 4 | 4 | - | - | 50 | 50 | 100 |
| **Total** | | | | **18** | **1** | **22** | **41^** | **350** | **150** | **275** | **275** | **1050** |

***(*):*** *Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of*

*COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs;* ***(^)****: Though 6 credits are allocated for Industrial Training it is only for awarding marks. As far as teaching load/time table preparation is considered, each faculty would be assigned with one batch of students (equivalent to practical batch size) for guiding the preparation of industrial training report and its evaluation. For this purpose 1 hour (or two hours on working Saturdays) teaching load would be considered.*

***Note***

a) *Evaluation of industrial training and its reports is to be done during this semester. Credits of Industrial Training will not affect the framing of the time table.*

b) *Students have to choose any one elective group in V semester* ***as stream specific specialisation,*** *and have to take first course of that group as elective- I in V semester. They would be required to take another two courses of the same group/stream in VI semester as elective - II and elective - III. Their major and minor projects should also have emphasis preferably on the same stream of specialisation.*

| Weighted mean score | S. No. and (Rank No.) of Report | Industry Questionnaire S. No. | Elective I - Group Name and Specialization |
|---|---|---|---|
| | | **Group A – Construction Technology** | |
| 2.69 | 23(12) | 30 | Rural Development |
| | | **Group B – Environmental Engineering** | |
| 2.46, 2.85 | 33(17), 18(9) | 36 | Water and Waste Water Management |
| | | **Group C – Transportation Engineering** | |
| 2.50 | 32(16) | 15 | Traffic Engineering |
| | | **Group D – Structural Engineering** | |
| 2.58 | 29(15) | 31 | Advanced Structural Engineering |

Programme Code**: ……..** **I- Scheme** Diploma Programme in **Civil Engineering**

**VI – Semester**

| Weighted mean score | S. No. and (Rank No.) of Report | Industry Questionnaire S. No. | Course Title | Teaching Scheme/Week | | | Credits (L+T+P) | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Theory | | Practical | | Grand Total |
| | | | | | | | | ESE | PA | ESE | PA | |
| 2.73 | 21(11) | 24 | Construction Management | 3 | - | - | 3 | 70 | 30* | - | - | 100 |
| 3.04 | 9(6) | 26 | Contracts and Accounts | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| | | | Maintenance and Restoration of Structures | 3 | - | 2 | 5 | 70 | 30* | - | - | 100 |
| | | | Elective - II | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| | | | Elective - III | 3 | - | 2 | 5 | 70 | 30* | 25 | 25 | 150 |
| 3.12 | G3(3) | 37 | Technical Writing (Common to all) | - | - | 2 | 2 | - | - | 25 | 25 | 50 |
| Industry need and MSBTE guidelines | | | Major Project (Common to all) | - | - | 6 | 6 | - | - | 75 | 75 | 150 |
| | | | **Total** | **15** | **-** | **16** | **31** | **350** | **150** | **175** | **175** | **850** |

***(*):*** *Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs* ***(~[1]):*** *For the courses having ONLY practical examination.*

***Note***

a) *The* ***Technical Writing*** *course is introduced as practical work, in which English faculty members would facilitate the framing of correct language for writing different chapters and presentation (i.e.PPT. and others) of their project work from English point of view. Name of English teacher has to be included as a 'Language Editor' in the project and this activity will be the part of practical shown against Technical Writing course at VI semester. This work shall be carried out for each batch (size same as for practical).*

*b) Students who have chosen the **stream specific specialisation** in elective – I in V semester, should choose the same stream/group courses in elective – II and elective – III in VI semester. Their **major project** should also have emphasis preferably on the same group/stream which could further sharpen their skills in that area.*

| Weighted mean score | S. No. and (Rank No.) of Report | Industry Questionnaire S. No. | Group Name and Specialization |
|---|---|---|---|
| | | **Group A – Construction Technology** | |
| 2.85 | 16(9) | 32 | **Elective II** - Advanced Construction Technology |
| 2.69 | 24(12) | 33 | **Elective III** - Building Services |
| | | **Group B – Environmental Engineering** | |
| 2.65 | 25(13) | 34 | **Elective II** - Solid Waste Management |
| 2.92 | 14(8) | 29 | **Elective III** - Environment and Energy Conservation |
| | | **Group C – Transportation Engineering** | |
| 2.69 | 23(12) | 30 | **Elective II –** Pavement Design |
| 2.92<br>2.69 | 13(1),<br>23(12) | 25, 30 | **Elective III** - Transportation Planning |
| | | **Group D – Structural Engineering** | |
| 2.69 | 24(12) | 33 | **Elective II** - Analysis of Structure and Earthquake Engineering |
| 2.77 | 20(10) | 35 | **Elective III** - Precast and Pre-stressed Concrete |

## I – Scheme Summary of Teaching Scheme/Week, Credits and Examination Scheme

## Civil Engineering

| Semester | Teaching Scheme/Week | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Theory | | Practical | | Grand Total |
| | L | T | P | (L+T+P) | ESE | PA | ESE | PA | |
| I | 15 | 2 | 16 | 33 | 210 | 90 | 200 | 200 | 700 |
| II | 19 | 2 | 14 | 35 | 385 | 165 | 175 | 175 | 900 |
| III | 16 | 2 | 16 | 34 | 350 | 150 | 200 | 200 | 900 |
| IV | 19 | 4 | 10 | 33 | 400 | 150 | 125 | 125 | 800 |
| V | 18 | 1 | 22 | 41 | 350 | 150 | 275 | 275 | 1050 |
| VI | 15 | - | 16 | 31 | 350 | 150 | 225 | 225 | 950 |
| **Grand Total** | **102** | **11** | **94** | **207** | 2045 | 855 | 1200 | 1200 | 5300 |

***(^)**: This includes total 6 credits for Industrial Training conducted during Summer Break between IV and V semester*.