

**SVERI's COLLEGE OF  
ENGINEERING,  
PANDHARPUR**



**PROGRAMME OUTCOMES  
AND  
COURSE OUTCOMES**

# **PROGRAMME OUTCOMES**

# DEPARTMENT OF CIVIL ENGINEERING

## Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **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.
4. **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.
5. **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.
6. **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.
7. **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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **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.

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR,  
DEPARTMENT OF CIVIL ENGINEERING**

**CO STATEMENT A.Y. 2023-24**

**CLASS: FOURTH YEAR SEMESTER: SEMESTER I**

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR**

**COURSE CO INFORMATION REPORT**

**ACADEMIC YEAR: 2023-24**

**PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING**

**CLASS: FOURTH YEAR**

**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: ESTIMATING, COSTING AND VALUATION (CE71C)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE71C.1	SELECT TECHNICAL SPECIFICATIONS FOR CIVIL ENGINEERING WORKS.	BL3 APPLY
2	CE71C.2	CALCULATE QUANTITIES OF ITEMS OF CONSTRUCTION FOR CIVIL ENGINEERING WORKS	BL3 APPLY, BL4 ANALYZE
3	CE71C.3	CALCULATE RATE ANALYSIS BASED ON MARKET RATES, SCHEDULE OF RATES AND OTHER RELEVANT STANDARD DOCUMENTS AND CODES.	BL3 APPLY
4	CE71C.4	SHOW TENDER DOCUMENTS AND EXPLAIN CONTRACT PROCEDURES.	BL3 APPLY
5	CE71C.5	SHOW THE VALUATION REPORTS FOR LAND AND BUILDINGS.	BL3 APPLY
6	CE71C.6	ANALYZE AND EVALUATE ECONOMIC ALTERNATIVES FOR CIVIL ENGINEERING PROJECTS.	BL3 APPLY

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**CLASS: FOURTH YEAR**

**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: EARTHQUAKE ENGINEERING (CE72C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE72C.1	EXPLAIN THE CONCEPT OF SEISMOLOGY.	BL2 UNDERSTAND
2	CE72C.2	ANALYZE SDOF SYSTEM FOR FREE AND FORCED VIBRATION.	BL4 ANALYZE
3	CE72C.3	DYNAMIC ANALYSIS OF STRUCTURES BY RESPONSE SPECTRUM THEORY FOR VARIOUS LOADING CONDITIONS.	BL4 ANALYZE
4	CE72C.4	CALCULATE SIESMIC LOAD FOR MULTYSTORY BUILDING	BL4 ANALYZE
5	CE72C.5	EVALUTION OF SIESMIC FORCES	BL4 ANALYZE
6	CE72C.6	EXPLAIN THE VARIOUS PHILOSOPHIES OF FAILURE OF EARTHQUAKE RESISTANT CONSTRUCTION.	BL3 APPLY

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**CLASS: FOURTH YEAR**

**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: CONSTRUCTION MANAGEMENT AND PRACTICES (CE73C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE73C.1	PLAN THE PROJECT AND PREPARE BAR CHART AND NETWORK TO OPTIMIZE THE PROJECT DURATION AND COST	BL1 REMEMBER, BL2 UNDERSTAND
2	CE73C.2	UPDATE THE NETWORK AND RE-EVALUATE THE RESOURCES.	BL5 EVALUATE
3	CE73C.3	USE APPROPRIATE PROJECT MANAGEMENT APPLICATION SOFTWARE FOR PLANNING, TRACKING AND REPORTING PROGRESS OF CIVIL ENGINEERING PROJECTS.	BL6 CREATE
4	CE73C.4	CALCULATE OUTPUT OF EARTHMOVING, HOISTING, DREDGING EQUIPMENTS.	BL4 ANALYZE
5	CE73C.5	ADOPT APPROPRIATE SAFETY MEASURES FOR VARIOUS CIVIL ENGINEERING PROJECTS.	BL3 APPLY
6	CE73C.6	EXPLAIN PREFABRICATED CONSTRUCTIONS, DIAPHRAGM WALL CONSTRUCTIONS, ADVANCED FORMWORK AND HOT MIX PLANT	BL2 UNDERSTAND

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**COURSE CO INFORMATION REPORT****ACADEMIC YEAR: 2023-24****PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING****CLASS: FOURTH YEAR****SEMESTER: SEMESTER I****DIVISION: A****PROFESSIONAL ELECTIVE COURSE- II TRAFFIC ENGINEERING AND MANAGEMENT**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE74E.1	EXPLAIN THE COMPONENTS OF ROAD TRAFFIC AND TRAFFIC CHARACTERISTICS: ROAD USER CHARACTERISTICS, VEHICULAR CHARACTERISTICS	BL2 UNDERSTAND
2	CE74E.2	CONDUCT VARIOUS TRAFFIC STUDIES AND ANALYSIS OF TRAFFIC DATA INCLUDING PARKING STUDIES AND CALCULATION OF PARKING DEMAND.	BL3 APPLY
3	CE74E.3	EXPLAIN RELATION BETWEEN FLOW, DENSITY, SPEED, CONCEPT OF LEVEL OF SERVICE FOR URBAN AND RURAL AREA.	BL2 UNDERSTAND
4	CE74E.4	EXPLAIN THE REGULATIONS ON VEHICLE, DRIVER AND SPEED AND VEHICLE AS PER MOTOR VEHICLE RULES.	BL2 UNDERSTAND
5	CE74E.5	DESIGN INTERSECTIONS AND SIGNALS AND PROPOSE VARIOUS TRAFFIC SIGNS, ROAD MARKING AND LIGHTING AT VARIOUS LOCATIONS.	BL3 APPLY
6	CE74E.6	EXPLAIN APPLICATIONS AND PRINCIPLES OF VARIOUS MODERN INSTRUMENTS USED IN TRAFFIC STUDIES.	BL2 UNDERSTAND

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<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
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1	CE75L.1	SELECT TECHNICAL SPECIFICATIONS FOR CIVIL ENGINEERING WORKS.	BL3 APPLY
2	CE75L.2	CALCULATE QUANTITIES OF ITEMS OF CONSTRUCTION FOR CIVIL ENGINEERING WORKS	BL3 APPLY, BL4 ANALYZE
3	CE75L.3	CALCULATE RATE ANALYSIS BASED ON MARKET RATES, SCHEDULE OF RATES AND OTHER RELEVANT STANDARD DOCUMENTS AND CODES.	BL3 APPLY
4	CE75L.4	SHOW THE VALUATION REPORTS FOR LAND AND BUILDINGS.	BL3 APPLY

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**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: CONSTRUCTION MANAGEMENT AND PRACTICES (CE76L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE76L.1	PLAN THE PROJECT AND PREPARE BAR CHART AND NETWORK TO OPTIMIZE THE PROJECT DURATION AND COST	BL1 REMEMBER, BL2 UNDERSTAND

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**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: PROJECT ON R. C. C. STRUCTURES (CE77P)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE77P.1	APPLY CODAL PROVISION IN THE ANALYSIS AND DESIGN OF STRUCTURES IN ACCORDANCE WITH RELEVANT IS CODES.	BL3 APPLY
2	CE77P.2	DEMONSTRATE DETAILED DRAWING OF R.C.C SECTION OF DESIGNED BUILDING.	BL3 APPLY

3	CE77P.3	ANALYSIS OF RCC STRUCTURES USING RELEVANT APPLICATION SOFTWARE	BL4 ANALYZE
4	CE77P.4	ANALYSIS FOOTING/WATER TANK/CANTILEVER WALL USING RELEVANT IS CODES.	BL4 ANALYZE

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**DIVISION: A**

**COURSE: SEMINAR (CE78S)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE78S.1	TO EXPOSE THE STUDENTS TO A VARIETY OF SUBJECTS AND RESEARCH ACTIVITIES IN CIVILENGINEERING IN ORDER TO ENRICH THEIR ACADEMIC EXPERIENCE.	BL3 APPLY
2	CE78S.2	TO ACQUAINTS DEPARTMENT MEMBERS WITH ALL FINAL YEAR STUDENTS WITHIN THE DEPARTMENT AND LEARN ABOUT EACH STUDENTSâ€™ SEMINAR ACTIVITIES.	BL3 APPLY
3	CE78S.3	TO GIVE AN OPPORTUNITY FOR STUDENTS TO DEVELOP SKILLS IN PRESENTATION AND DISCUSSION OF VARIOUS TOPICS IN A PUBLIC FORUM.	BL2 UNDERSTAND

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**DIVISION: A**

**COURSE: ASSESSMENT OF REPORT ON FIELD TRAINING (CE79V)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE79V.1	DEMONSTRATE THE USE,INTERPRETATION AND APPLICATION OF AN APPROPRIATE INTERNATIONAL ENGINEERING STANDARD IN A SPECIFIC SITUTATIONS.	BL3 APPLY



2	CE79V.2	ANALYZE A GIVEN ENGINEERING PROBLEM, IDENTIFY AN APPROPRIATE PROBLEM SOLVING METHODOLOGY ,IMPLEMENT THE METHODOLOGY AND PROPOSE A MEANINGFUL SOLUTION.	BL5 EVALUATE
3	CE79V.3	CONCLUDE A PROJECT WITHIN A GIVEN TIME FRAME.	BL5 EVALUATE
4	CE79V.4	APPLY PRIOR ACQUIRED KNOWLEDGE IN PROBLEM SOLVING	BL3 APPLY
5	CE79V.5	APPLY FACTUAL APPROACH TO DECISION MAKING.	BL2 UNDERSTAND
6	CE79V.6	RECOMMING SOLUTION TO RESOLVE PROBLEMS.	BL5 EVALUATE

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**COURSE: CIVIL ENGINEERING SYSTEM ANALYSIS AND DESIGN (HN714)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	HN714.1	EXPLAIN THE CONCEPTS OF SYSTEM ENGINEERING	BL2 UNDERSTAND
2	HN714.2	APPLY MEASURES OF EFFECTIVENESS FOR GOALS AND OUTCOMES	BL3 APPLY
3	HN714.3	APPLY VARIOUS TASKS OF SYSTEM DEVELOPMENT	BL3 APPLY
4	HN714.4	PERFORM THE NEED ASSESSMENT FOR SYSTEMS DEVELOPMENT	BL3 APPLY
5	HN714.5	APPLY VARIOUS ASPECTS OF SYSTEM PLANNING	BL3 APPLY
6	HN714.6	APPLY VARIOUS ASPECTS OF SYSTEM DESIGN	BL3 APPLY

**CLASS: FOURTH YEAR SEMESTER: SEMESTER II**

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**SEMESTER: SEMESTER II****DIVISION: A****RSE: PROFESSIONAL ELECTIVE III - RAPAIR & REHABILITATION OF STRUCTURES (CE**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE75E.1	UNDERSTAND THE FUNDAMENTALS OF MAINTENANCE AND REPAIR STRATEGIES.	BL1 REMEMBER, BL2 UNDERSTAND
2	CE75E.2	IDENTIFY FOR SERVICEABILITY AND DURABILITY ASPECTS OF CONCRETE.	BL1 REMEMBER, BL2 UNDERSTAND
3	CE75E.3	KNOW THE MATERIALS AND TECHNIQUES USED FOR REPAIR OF STRUCTURES.	BL1 REMEMBER, BL2 UNDERSTAND
4	CE75E.4	DECIDE THE APPROPRIATE REPAIR AND RETROFITTING TECHNIQUES.	BL1 REMEMBER, BL2 UNDERSTAND

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Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE81H.1	EXPLAIN ROLE OF VARIOUS STAKEHOLDERS IN THE CIVIL ENGINEERING PROFESSION	BL2 UNDERSTAND
2	CE81H.2	INTERPRET AND EXPLAIN FUNDAMENTAL ETHICS GOVERNING THE PROFESSION SOCIETY AS PRACTITIONERS OF THE CIVIL ENGINEERING PROFESSION	BL2 UNDERSTAND
3	CE81H.3	DRAFT AND INTERPRET CONTRACTS AND CONTRACTS MANAGEMENT IN CIVIL ENGINEERING, DISPUTE RESOLUTION MECHANISMS AND LAWS GOVERNING ENGAGEMENT OF LABOUR	BL2 UNDERSTAND
4	CE81H.4	DESCRIBE ARBITRATION AND EXPERT DETERMINATION; EXTENT OF JUDICIAL INTERVENTION; INTERNATIONAL COMMERCIAL ARBITRATION	BL2 UNDERSTAND
5	CE81H.5	EXPLAIN LEGAL AND PRACTICAL ASPECTS OF CIVIL ENGINEERING PROFESSION	BL2 UNDERSTAND
6	CE81H.6	EXPLAIN PROCESS OF FILING INTELLECTUAL PROPERTY RIGHTS AND PATENTS	BL2 UNDERSTAND

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**SEMESTER: SEMESTER II**

**DIVISION: A**

**COURSE: PROJECT WORK (CE8P)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE8P.1	IDENTIFY AND FORMULATE CIVIL ENGINEERING PROBLEMS TO MEET DESIRED NEED WITHIN REALISTIC CONSTRAINTS	BL6 CREATE
2	CE8P.2	DESIGN THE SOLUTION USING MODERN DESIGN TOOLS AND TECHNIQUES WITH THE UNDERSTANDING OF THE IMPACT OF ENGINEERING SOLUTIONS IN A GLOBAL, ECONOMIC, ENVIRONMENTAL, AND SOCIETAL CONTEXT	BL6 CREATE
3	CE8P.3	DEVELOP AN ABILITY TO WORK ON MULTIDISCIPLINARY ENVIRONMENT TO EVALUATE THE ECONOMIC AND FINANCIAL PERFORMANCE OF AN ENGINEERING ACTIVITY	BL5 EVALUATE
4	CE8P.4	BUILD MODELS, PROTOTYPES AND CONDUCT VARIOUS EXPERIMENTS TO DEVELOP DIVERSE SET OF DESIGN SOLUTIONS WITH APPROPRIATE CONSIDERATION FOR SAFETY	BL6 CREATE
5	CE8P.5	BREAK DOWN A COMPLEX PROBLEM INTO PARTS AND ANALYZE THE RELATIONSHIPS BETWEEN THE DIFFERENT PARTS OF COMPLEX PROBLEM	BL4 ANALYZE
6	CE8P.6	SHOW AN ABILITY TO COMMUNICATE EFFECTIVELY IN TEAM AND PRESENT RESULTS AS A TEAM, WITH SMOOTH INTEGRATION, SUBSTANTIATED CONCLUSIONS AND DOCUMENTATION OF PROJECT WORK	BL3 APPLY

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**SEMESTER: SEMESTER II****DIVISION: A****COURSE: SELF LEARNING TECHNICAL COURSE (SL-2)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	SL-2.1	DESCRIBE THE KNOWLEDGE OF CEMENT, CONCRETE AND ADMIXTURE TO FULFIL REQUIREMENT OF CONSTRUCTION INDUSTRY.	BL2 UNDERSTAND
2	SL-2.2	DEMONSTRATE PROPERTIES OF FRESH CONCRETE AND DURABILITY OF CONCRETE	BL3 APPLY
3	SL-2.3	DESCRIBE PROPERTIES AND APPLICATION OF SPECIAL CONCRETE	BL2 UNDERSTAND
4	SL-2.4	EXPLAIN SPECIAL PROCESS AND TECHNOLOGY FOR PARTICULAR TYPE OF CONCRETE STRUCTURES	BL2 UNDERSTAND
5	SL-2.5	DESIGN A CONCRETE MIX ACCORDING TO CONSTRUCTION INDUSTRY STIPULATION	BL3 APPLY
6	SL-2.6	DESCRIBE STRENGTHENING TECHNIQUES OF CONCRETE STRUCTURES DUE TO DISTRESS IN CONCRETE	BL2 UNDERSTAND

**CLASS: THIRD YEAR SEMESTER: SEMESTER I****SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR****COURSE CO INFORMATION REPORT****ACADEMIC YEAR: 2023-24****PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING****CLASS: THIRD YEAR****SEMESTER: SEMESTER I****DIVISION: A****COURSE: ENVIRONMENTAL ENGINEERING-II (CE510L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE510L.1	EXAMINE VARIOUS WASTE WATER QUALITY PARAMETER	BL3 APPLY
2	CE510L.2	DETERMINE THE CHARACTERISTICS OF WASTE WATER ON THE BASIS OF OXYGEN DEMAND	BL3 APPLY
3	CE510L.3	EVALUATE AIR POLLUTION CONCENTRATION OF GASEOUS AND PARTICULATE MATTER	BL6 CREATE

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**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: DESIGN OF STEEL STRUCTURES (CE51C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE51C.1	APPLY "LIMIT STATE" DESIGN APPROACH FOR DESIGNING VARIOUS ELEMENTS OF STEEL STRUCTURES FOR STRENGTH AND SERVICEABILITY.	BL3 APPLY
2	CE51C.2	DESIGN VARIOUS STEEL STRUCTURE ELEMENTS VIZ. BOLTED AND WELDED CONNECTIONS AS PER PROCEDURES DEFINED BY INDIAN STANDARD CODE OF PRACTICE : IS 800: 2007	BL3 APPLY
3	CE51C.3	DESIGN A TENSION MEMBERS ,COMPRESSION MEMBERS AS PER PROCEDURES DEFINED BY INDIAN STANDARD CODE OF PRACTICE : IS 800: 2007	BL3 APPLY
4	CE51C.4	DESIGN A BEAM AS PER PROCEDURES DEFINED BY INDIAN STANDARD CODE OF PRACTICE : IS 800: 2007.	BL3 APPLY
5	CE51C.5	DESIGN COLUMN, COLUMN BASE AS PER PROCEDURES DEFINED BY INDIAN STANDARD CODE OF PRACTICE : IS 800: 2007	BL3 APPLY
6	CE51C.6	ANALYZE BEAMS BY PLASTIC ANALYSIS APPROACH.	BL4 ANALYZE

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**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: GEOTECHNICAL ENGINEERING (CE52C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
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1	CE52C.1	DEMONSTRATE EXPERIMENTS ON SOIL TO CALCULATE VARIOUS INDICES AND STRENGTH PROPERTIES TO UNDERSTAND BEHAVIOR OF SOIL	BL3 APPLY
2	CE52C.2	APPLY BASIC HYDRAULIC FLOW PRINCIPLES TO SOILS, TO CALCULATE THE SEEPAGE THROUGH EARTH STRUCTURES AND FOUNDATIONS	BL3 APPLY
3	CE52C.3	APPLY ONE DIMENSIONAL CONSOLIDATION THEORY TO ESTIMATE TIME-DEPENDENT SETTLEMENTS OF FOUNDATIONS.	BL3 APPLY
4	CE52C.4	SELECT A SUITABLE METHOD FOR ESTIMATING EARTH PRESSURE FOR A GIVEN SITUATION.	BL4 ANALYZE
5	CE52C.5	DEMONSTRATE EXPERIMENTS ON SOIL TO CALCULATE PERMEABILITY & SHEAR STRENGTH TO UNDERSTAND BEHAVIOR OF SOIL	BL3 APPLY
6	CE52C.6	ANALYSIS OF STRESS ACTING ON SOIL	BL4 ANALYZE

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**DIVISION: A**

**COURSE: HIGHWAY AND TUNNEL ENGINEERING (CE53C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE53C.1	PREDICT THE IDEAL ALIGNMENT FOR HIGHWAYS AFTER THOROUGH UNDERSTANDING OF PLANNING AND DIFFERENT SURVEYS	BL3 APPLY
2	CE53C.2	DESIGN VARIOUS GEOMETRIC ELEMENTS OF HIGHWAY AS PER IRC STANDARDS	BL3 APPLY
3	CE53C.3	SELECT THE PAVEMENT MATERIALS THROUGH VARIOUS TESTS IN THE LABORATORY AND DESIGN THE CRUST THICKNESS OF FLEXIBLE AND RIGID PAVEMENTS AS PER IRC STANDARDS.	BL3 APPLY, BL4 ANALYZE
4	CE53C.4	DESIGN DIFFERENT LAYERS OF FLEXIBLE AND RIGID PAVEMENT AS PER IRC STANDARDS.	BL3 APPLY

5	CE53C.5	ILLUSTRATE THE CONSTRUCTION PROCESS AND ALSO SUGGEST MAINTENANCE ACTIVITIES FOR FLEXIBLE AND RIGID PAVEMENT.	BL3 APPLY
6	CE53C.6	SELECT APPROPRIATE METHOD OF TUNNEL CONSTRUCTION IN DIFFERENT TYPES OF SOILS.	BL4 ANALYZE

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**DIVISION: A**

**COURSE: HYDROLOGY AND WATER RESOURCES ENGINEERING (CE54C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE54C.1	ESTIMATE RUNOFF, BASED ON RAINFALL DATA AND WATERSHED CHARACTERISTICS.	BL2 UNDERSTAND, BL3 APPLY
2	CE54C.2	ESTIMATE DESIGN FLOOD FOR A CIVIL ENGINEERING PROJECT	BL2 UNDERSTAND, BL3 APPLY
3	CE54C.3	CALCULATE YIELD OF OPEN WELL AND TUBE WELL FOR VARIOUS TYPES OF AQUIFERS USING KNOWLEDGE OF GROUND WATER HYDROLOGY.	BL2 UNDERSTAND, BL3 APPLY
4	CE54C.4	ELABORATE NATIONAL AND STATE WATER POLICIES.	BL2 UNDERSTAND
5	CE54C.5	SELECT APPROPRIATE WATER APPLICATION TECHNIQUE OF IRRIGATION, DEPENDING UPON TYPE OF CROP, SOIL MOISTURE AND WATER AVAILABILITY.	BL3 APPLY
6	CE54C.6	SELECT SUITABLE SOIL & WATER CONSERVATION TECHNIQUES FOR PARTICULAR WATERSHED	BL2 UNDERSTAND, BL3 APPLY

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**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: HYDROLOGY AND WATER RESOURCES ENGINEERING (CE54C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE54C.1	ESTIMATE RUNOFF, BASED ON RAINFALL DATA AND WATERSHED CHARACTERISTICS.	BL2 UNDERSTAND, BL3 APPLY
2	CE54C.2	ESTIMATE DESIGN FLOOD FOR A CIVIL ENGINEERING PROJECT	BL2 UNDERSTAND, BL3 APPLY
3	CE54C.3	CALCULATE YIELD OF OPEN WELL AND TUBE WELL FOR VARIOUS TYPES OF AQUIFERS USING KNOWLEDGE OF GROUND WATER HYDROLOGY.	BL2 UNDERSTAND, BL3 APPLY
4	CE54C.4	ELABORATE NATIONAL AND STATE WATER POLICIES.	BL2 UNDERSTAND
5	CE54C.5	SELECT APPROPRIATE WATER APPLICATION TECHNIQUE OF IRRIGATION, DEPENDING UPON TYPE OF CROP, SOIL MOISTURE AND WATER AVAILABILITY.	BL3 APPLY
6	CE54C.6	SELECT SUITABLE SOIL & WATER CONSERVATION TECHNIQUES FOR PARTICULAR WATERSHED	BL2 UNDERSTAND, BL3 APPLY

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**COURSE: ENVIRONMENTAL ENGINEERING-II (CE56C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE56C.1	PLAN AND DESIGN THE APPROPRIATE SEWAGE COLLECTION SYSTEM AND CHARACTERIZE THE MUNICIPAL WASTE WATER.	BL3 APPLY
2	CE56C.2	EVALUATE AND DESIGN WASTE WATER COLLECTION SYSTEM AND WASTEWATER TREATMENT UNITS.	BL3 APPLY
3	CE56C.3	APPLY THE LOW COST TREATMENT TECHNOLOGIES TO TREAT THE SEWAGE	BL3 APPLY
4	CE56C.4	IDENTIFY THE APPROPRIATE METHOD FOR THE DISPOSAL OF TREATED/UNTREATED WASTE WATER	BL3 APPLY
5	CE56C.5	SELECT APPROPRIATE METHODS OF SOLID WASTE DISPOSAL AND MANAGEMENT OF HAZARDOUS WASTE	BL4 ANALYZE



6	CE56C.6	SUMMARIZE AIR POLLUTION IMPACTS AND PLAN FOR CONTROL IT	BL2 UNDERSTAND
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**COURSE: GEOTECHNICAL ENGINEERING (CE57L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE57L.1	DEMONSTRATE EXPERIMENTS ON SOIL TO CALCULATE VARIOUS INDICES AND STRENGTH PROPERTIES TO UNDERSTAND BEHAVIOR OF SOIL	BL3 APPLY
2	CE57L.2	APPLY BASIC HYDRAULIC FLOW PRINCIPLES TO SOILS, TO CALCULATE THE SEEPAGE THROUGH EARTH STRUCTURES AND FOUNDATIONS	BL3 APPLY
3	CE57L.3	DEMONSTRATE EXPERIMENTS ON SOIL TO CALCULATE PERMEABILITY & SHEAR STRENGTH TO UNDERSTAND BEHAVIOR OF SOIL	BL3 APPLY

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**COURSE: HIGHWAY & TUNNEL ENGINEERING (CE58L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE58L.1	SELECT THE PAVEMENT MATERIALS THROUGH VARIOUS TESTS IN THE LABORATORY AND DESIGN THE CRUST THICKNESS OF FLEXIBLE AND RIGID PAVEMENTS AS PER IRC STANDARDS.	BL3 APPLY, BL4 ANALYZE

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<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE59L.1	PLAN AND DESIGN A PUBLIC BUILDING ACCORDING TO REQUIRMENT ADHERING TO NATIONAL BUILDING CODE NORMS AND STANDARDS	BL3 APPLY
2	CE59L.2	BPREPARE PERMISSION DRAWING FOR PUBLIC BUILDING FOR OBTAINING BUILDING PERMISSION FROM COMPETENT AUTHORITY BY USING SUITABLE COMPUTER AIDED DRAWING AND DESIGN APPLICATION SOFTWARE.	BL3 APPLY
3	CE59L.3	PLAN AND DESIGN OF PUBLIC BUILDING SERVICES LAYOUT FOR FURNITURE REQUIRMENTS, ELECTRIFICATION POINTS WATERSUPPLY AND DRAINAGE SYSTEM FOR A BUILDING AS PER STANDARDS NORMS BY USING SUITABLE COMPUER AIDED DRAWING AND DESIGN APPLICATION SOFTWARE	BL3 APPLY
4	CE59L.4	PREPARE PERSPECTIVE DRAWAING OF THE BUILDING AND LINE PLAN OF ANY TWO PUBLIC BUILDINGS BY USING SUITABLE COMPUTER AIDED DRAWING AND DESIGN APPLICATION SOFTWARE	BL3 APPLY
5	CE59L.5	PREPARE REPORT ON SELECTED PUBLIC BUILDING	BL3 APPLY
6	CE59L.6	BASIC FUNDAMENTALS OF CAAD	BL2 UNDERSTAND

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Sr. No.	CO Code	CO Statements	Bloom's Level
1	HN512.1	ELABORATE THE PROCESS OF EVALUATION OF ENTREPRENEURSHIP	BL2 UNDERSTAND
2	HN512.2	APPLY THE CREATIVITY AND INNOVATION APPROACHES FOR PRODUCT DEVELOPMENT	BL3 APPLY
3	HN512.3	APPLY INNOVATION STRATEGIES FOR TRANSFORMING THE INNOVATION INTO ENTREPRENEURIAL ACTIVITIES	BL3 APPLY
4	HN512.4	EXPLAIN THE APPROACHES OF MOTIVATING ENTREPRENEURS	BL2 UNDERSTAND
5	HN512.5	UNDERSTAND INTERNATIONAL ENTREPRENEURSHIP	BL2 UNDERSTAND
6	HN512.6	APPLY PROBLEM IDENTIFICATION AND PROBLEM SOLVING APPROACHES	BL3 APPLY

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**COURSE: HSS COURSE æ“ ELECTIVE (SELF LEARNING MODE) (SL-5)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	SL-5.1	INCULCATE THE HUMAN VALUES IN THEIR BEHAVIOR.	BL5 EVALUATE
2	SL-5.2	DEMONSTRATE THE ENGINEERING ETHICS IN THEIR PROFESSIONAL PRACTICE.	BL3 APPLY
3	SL-5.3	PRACTICE THE SAFETY AND RESPONSIBILITY AND PROFESSIONAL RIGHTS IN THEIR PROFESSIONAL PRACTICE.	BL3 APPLY
4	SL-5.4	<b>INCORPORATE THE CODE OF ETHICS OF GLOBAL ORGANIZATIONS SUCH AS ASME, ASCE, AND IEEE</b>	

**CLASS: THIRD YEAR SEMESTER: SEMESTER II**

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**DIVISION: A**

**COURSE: FOUNDATION ENGINEERING (CE61C)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE61C.1	EVALUATE ULTIMATE BEARING CAPACITY AND SETTLEMENT OF VARIOUS TYPES OF SOILS	BL3 APPLY
2	CE61C.2	DEMONSTRATE VARIOUS FIELD TESTS SUCH AS PLATE LOAD TEST, SPT AND INTERPRET DATA OF FIELD TEST FOR EVALUATION OF BEARING CAPACITY	BL3 APPLY
3	CE61C.3	DESCRIBE GEOTECHNICAL DESIGN OF DIFFERENT TYPES OF FOUNDATIONS SUCH AS ISOLATED FOOTINGS, COMBINED FOOTING, RAFT FOUNDATION ETC	BL2 UNDERSTAND
4	CE61C.4	SELECT AND APPLY SUITABLE GROUND IMPROVEMENT TECHNIQUES FOR GIVEN FIELD AND LOADING CONDITIONS	BL4 ANALYZE
5	CE61C.5	DESIGN CANTILEVER AND ANCHORED SHEET PILE AND VARIOUS TYPES OF SOILS	BL3 APPLY
6	CE61C.6	APPLY THE KNOWLEDGE OF VARIOUS SLOPE STABILITY THEORIES OF DESIGN OF EMBANKMENTS	BL3 APPLY

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**COURSE: HYDRAULIC STRUCTURES AND WATER POWER ENGG (CE62C)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE62C.1	PLAN AND DESIGN THE DAMS AND RESERVOIRS DEPENDING UPON THE WATER RESOURCES POTENTIAL	BL2 UNDERSTAND, BL3 APPLY
2	CE62C.2	ANALYZE AND DESIGN GRAVITY DAMS AND EARTH DAMS (SIMPLE DESIGNS)	BL2 UNDERSTAND, BL3 APPLY
3	CE62C.3	ELABORATE THE DESIGN PRINCIPLES OF ARCH DAMS AND WEIRS ON PERMEABLE FOUNDATIONS	BL2 UNDERSTAND, BL3 APPLY

4	CE62C.4	CARRY OUT HYDRAULIC DESIGN OF SPILLWAYS AND CANAL STRUCTURES	BL3 APPLY
5	CE62C.5	SELECT APPROPRIATE METHOD OF RIVER TRAINING DEPENDING UPON RIVER CHARACTERISTICS	BL2 UNDERSTAND, BL3 APPLY
6	CE62C.6	ESTIMATE WATER POWER POTENTIAL AT A SITE.	BL3 APPLY

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**COURSE: PROFESSIONAL ELECTIVE COURSE-I-ACT (CE63E)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE63E.1	DESCRIBE THE KNOWLEDGE OF CEMENT, CONCRETE AND ADMIXTURE TO FULFIL REQUIREMENT OF CONSTRUCTION INDUSTRY.	BL2 UNDERSTAND
2	CE63E.2	DEMONSTRATE PROPERTIES OF FRESH CONCRETE AND DURABILITY OF CONCRETE	BL3 APPLY
3	CE63E.3	DESCRIBE PROPERTIES AND APPLICATION OF SPECIAL CONCRETE	BL2 UNDERSTAND
4	CE63E.4	EXPLAIN SPECIAL PROCESS AND TECHNOLOGY FOR PARTICULAR TYPE OF CONCRETE STRUCTURES	BL2 UNDERSTAND
5	CE63E.5	DESIGN A CONCRETE MIX ACCORDING TO CONSTRUCTION INDUSTRY STIPULATION	BL3 APPLY
6	CE63E.6	DESCRIBE STRENGTHENING TECHNIQUES OF CONCRETE STRUCTURES DUE TO DISTRESS IN CONCRETE	BL2 UNDERSTAND

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**COURSE: DESIGN OF CONCRETE STRUCTURES II (CE64C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE64C.1	ANALYZE AND DESIGN OF RCC STAIRS AND COLUMN FOOTINGS	BL3 APPLY, BL4 ANALYZE
2	CE64C.2	ANALYZE AND DESIGN OF RCC RETAINING WALLS AND WATER TANKS	BL3 APPLY, BL4 ANALYZE
3	CE64C.3	ANALYZE PRE STRESS CONCRETE SECTIONS	BL4 ANALYZE
4	CE64C.4	DETERMINE LOSS OF PRESTRESS AND DESIGN OF PRESTRESS BEAMS	BL3 APPLY, BL4 ANALYZE
5	CE64C.5	ANALYZE AND DESIGN OF END BLOCK OF POST TENSIONED PSC GIRDER	BL3 APPLY, BL4 ANALYZE

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**COURSE: PRINCIPLES OF MANAGEMENT AND QUANTITATIVE TECHNIQUES (CE65C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE65C.1	DEMONSTRATE DECISION MAKING AND COMMUNICATION AS A MEMBER OF A TEAM AS WELL AS LEAD A TEAM FOR EFFECTIVE MANAGEMENT OF CONSTRUCTION PROJECTS.	BL3 APPLY
2	CE65C.2	APPLY THE OPTIMIZATION TECHNIQUES FOR DECISION MAKING IN CONSTRUCTION INDUSTRY.	BL3 APPLY
3	CE65C.3	EXPLAIN THE LEAN CONSTRUCTION TECHNIQUE AND ITS USE IN CONSTRUCTION INDUSTRY	BL2 UNDERSTAND
4	CE65C.4	CARRY OUT ABC ANALYSIS, BREAK EVEN ANALYSIS AND CALCULATE EOQ AND INVENTORY COSTS FOR CONSTRUCTION PROJECT.	BL5 EVALUATE
5	CE65C.5	LIST THE VARIOUS TYPES OF MASTER LIBRARIES IN THE ERP SYSTEM.	BL2 UNDERSTAND
6	CE65C.6	USE STATISTICAL METHODS AND CONTROL CHARTS (X, R, P, C CHARTS) FOR QUALITY CONTROL OF MATERIALS AND WORKMANSHIP IN CIVIL ENGINEERING PROJECTS.	BL3 APPLY

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<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE66C.1	DESIGN GEOMETRIC ASPECTS OF RAILWAY TRACK	BL3 APPLY
2	CE66C.2	CALCULATE THE MATERIAL QUANTITIES REQUIRED FOR CONSTRUCTION WITH ENGINEERING MATERIAL PROPERTIES	BL3 APPLY
3	CE66C.3	ILLUSTRATE DIFFERENT TYPES OF SIGNALS WITH WORKING PRINCIPLES OF RAILWAY INTERLOCKING SYSTEM.	BL3 APPLY
4	CE66C.4	OUTLINE THE SITE SELECTION OF AIRPORT DESIGN AND PLANNING	BL4 ANALYZE
5	CE66C.5	DESIGN THE ELEMENTS FOR ORIENTATION OF RUNWAYS AND PASSENGER FACILITY SYSTEMS.	BL3 APPLY
6	CE66C.6	EXPLAIN THE VARIOUS FEATURES IN HARBOURS AND PORTS, THEIR CONSTRUCTION, COASTAL PROTECTION WORKS AND COASTAL REGULATIONS TO BE ADOPTED.	BL3 APPLY

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<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE67L.1	ANALYZE AND DESIGN VARIOUS PARAMETERS TO SELECT AND DETERMINE THE GEOMETRY OF ROOF TRUSSES OR PORTAL FRAMES FOR A GIVEN STRUCTURAL DESIGN PROJECT.	BL4 ANALYZE

2	CE67L.2	ANALYZE AND DESIGN OF VARIOUS COMPONENTS OF INDUSTRIAL SHED WITH ROOF TRUSS OR PORTAL FRAME OR GABLE FRAME USING RELEVANT SOFTWARE AND PREPARE THEIR DETAILED COMPUTER AIDED DRAWING.	BL4 ANALYZE
3	CE67L.3	DESIGN THE VARIOUS COMPONENTS OF BUILDING FRAME/FOOT BRIDGE/WELDED PLATE GIRDER/OFFSHORE STRUCTURE/PRE-ENGINEERED BUILDING AND PREPARE THEIR DETAILED COMPUTER AIDED DRAWINGS.	BL4 ANALYZE
4	CE67L.4	ANALYZE AND EVALUATE THE STEEL STRUCTURE USING STANDARD STRUCTURAL ENGINEERING APPLICATION SOFTWARE.	BL5 EVALUATE
5	CE67L.5	CREATE A REPORT FOR THE STRUCTURE AS PER ANALYSIS AND DESIGN.	BL5 EVALUATE

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**COURSE: PRINCIPLES OF MANAGEMENT AND QUANTITATIVE TECHNIQUES (CE68L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE68L.1	DEMONSTRATE DECISION MAKING AND COMMUNICATION AS A MEMBER OF A TEAM AS WELL AS LEAD A TEAM FOR EFFECTIVE MANAGEMENT OF CONSTRUCTION PROJECTS	BL3 APPLY
2	CE68L.2	APPLY THE OPTIMIZATION TECHNIQUES FOR DECISION MAKING IN CONSTRUCTION INDUSTRY.	BL3 APPLY
3	CE68L.3	EXPLAIN THE LEAN CONSTRUCTION TECHNIQUE AND ITS USE IN CONSTRUCTION INDUSTRY	BL2 UNDERSTAND
4	CE68L.4	CARRY OUT ABC ANALYSIS, BREAK EVEN ANALYSIS AND CALCULATE EOQ AND INVENTORY COSTS FOR CONSTRUCTION PROJECT.	BL5 EVALUATE
5	CE68L.5	LIST THE VARIOUS TYPES OF MASTER LIBRARIES IN THE ERP SYSTEM.	BL2 UNDERSTAND



6	CE68L.6	USE STATISTICAL METHODS AND CONTROL CHARTS (X, R, P, C CHARTS) FOR QUALITY CONTROL OF MATERIALS AND WORKMANSHIP IN CIVIL ENGINEERING PROJECTS.	BL3 APPLY
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**COURSE: MINI PROJECT USING APPLICATION SOFTWARE (CE69L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE69L.1	PERFORM POPULATION FORECASTING AND FORECASTING OF WATER REQUIREMENT.	BL3 APPLY
2	CE69L.2	PERFORM DRAWING OF WATER DISTRIBUTION SYSTEM.	BL3 APPLY
3	CE69L.3	DESIGN WATER DISTRIBUTION SYSTEM OF REQUIRED STANDARD AND ECONOMICAL ENVIRONMENT.	BL4 ANALYZE
4	CE69L.4	PERFORM ANALYSIS AND TROUBLESHOOTING OF NEW AND EXISTING SUPPLY NETWORK WITH ACCURACY AND MINIMUM TIME DURATION.	BL4 ANALYZE

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**COURSE: ENGINEERING SYSTEM DESIGN OPTIMIZATION (HN613)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	HN613.1	EXPLAIN THE FUNDAMENTALS OF OPTIMIZATION TECHNIQUES	BL2 UNDERSTAND
2	HN613.2	SOLVE THE SINGLE VARIABLE PROBLEMS USING VARIOUS OPTIMIZATION TECHNIQUES	BL3 APPLY

3	HN613.3	SOLVE THE MULTIVARIABLE PROBLEMS USING VARIOUS TECHNIQUES	BL3 APPLY
4	HN613.4	APPLY THE SPECIALIZED METHODS TO PROVIDE SOLUTIONS TO PRACTICAL PROBLEMS.	BL4 ANALYZE
5	HN613.5	APPLY THE GENETIC ALGORITHMS AND EVOLUTIONARY APPROACHES FOR SOLVING THE PRACTICAL PROBLEMS	BL3 APPLY
6	HN613.6	ELABORATE VARIOUS PRACTICAL ASPECTS OF OPTIMIZATION FOR SOLVING UNCONVENTIONAL PROBLEMS	BL2 UNDERSTAND

**CLASS: SECOND YEAR SEMESTER: SEMESTER I**

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**COURSE: SURVEYING & GEOMATICS (CE31C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE31C.1	UNDERSTAND THE TEMPORARY ADJUSTMENTS OF MODERN SURVEYING EQUIPMENTS AND THE ATTRIBUTES OF LEADERSHIP, WORKING IN THE TEAM AND PROFESSIONAL ETHICS WHILE PERFORMING THE SURVEYING PROJECTS.	BL2 UNDERSTAND
2	CE31C.2	EXPERIMENT WITH THE SURVEYING INSTRUMENTS SUCH AS THEODOLITE FOR MEASUREMENTS OF HORIZONTAL/ VERTICAL/INCLINED DISTANCE, HORIZONTAL/ VERTICAL ANGLES AND BEARINGS	BL3 APPLY
3	CE31C.3	ILLUSTRATE THE USE OF THE SURVEYING INSTRUMENTS NAMELY LEVELS EDM, TOTAL STATION FOR SURVEYING MEASUREMENTS SUCH AS HORIZONTAL/ VERTICAL/INCLINED DISTANCE, HORIZONTAL/ VERTICAL ANGLES, BEARINGS, REDUCED LEVELS, AND COORDINATES	BL3 APPLY
4	CE31C.4	USE THE INFORMATION OF MODERN SURVEYING TECHNIQUES NAMELY GLOBAL POSITIONING SYSTEM FOR CIVIL ENGINEERING APPLICATIONS.	BL3 APPLY

5	CE31C.5	USE THE MODERN SURVEYING TECHNIQUES NAMELY REMOTE SENSING FOR CIVIL ENGINEERING APPLICATIONS.	BL3 APPLY
6	CE31C.6	DETERMINE THE USE OF MODERN SURVEYING TECHNIQUES LIKE GEOGRAPHIC INFORMATION SYSTEM FOR CIVIL ENGINEERING APPLICATIONS SUCH AS DEVELOP PLANS, DRAW MAPS AND DRAFT REPORTS FOR SURVEYING PROJECTS OF CIVIL ENGINEERING WORKS	BL3 APPLY

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**COURSE: FLUID MECHANICS AND FLUID MACHINES (CE32C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE32C.1	COMPREHEND TECHNICAL PROPERTIES OF FLUIDS, CONCEPT OF SUBMERGED & FLOATING STRUCTURES IN A STATIC FLUID.	BL2 UNDERSTAND
2	CE32C.2	APPLY KINEMATICS AND DYNAMICS OF FLOW FOR SOLVING CIVIL ENGINEERING PROBLEMS.	BL3 APPLY
3	CE32C.3	QUANTIFY WATER FLOW THROUGH WEIRS, NOTCHES, VENTURIMETER, ORIFICE, AND PITOT TUBE.	BL3 APPLY
4	CE32C.4	DETERMINE PIPE LOSSES AND SOLVE PIPE NETWORKS.	BL3 APPLY
5	CE32C.5	PREDICT PHYSICAL PARAMETERS THAT INFLUENCE THE FLOW IN FLUID MECHANICS USING DIMENSIONAL ANALYSIS.	BL3 APPLY
6	CE32C.6	EXPLAIN THE WORKING OF PELTON, FRANCIS AND KAPLAN TURBINES AND PUMPS ALONG THEIR PERFORMANCE PARAMETERS.	BL2 UNDERSTAND

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Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE33C.1	UNDERSTAND PROPERTIES AND ROLE OF INGREDIENTS LIKES CEMENT, AGGREGATE ETC. TO PRODUCE BETTER QUALITY CONCRETE.	BL2 UNDERSTAND
2	CE33C.2	DEMONSTRATE LABORATORY TESTING OF VARIOUS INGREDIENTS OF CONCRETE FOR DETERMINING THEIR PHYSICAL PROPERTIES	BL3 APPLY
3	CE33C.3	EXPLAIN PROPERTIES OF FRESH AND HARDENED CONCRETE AND APPLY THIS KNOWLEDGE ON FIELD.	BL2 UNDERSTAND
4	CE33C.4	SELECT APPROPRIATE TYPE OF CONCRETE, ADMIXTURE AND CHEMICALS FOR SPECIFIC REQUIREMENTS	BL4 ANALYZE
5	CE33C.5	DESIGN A CONCRETE MIX OF REQUIRED STRENGTH AND DURABILITY, FOR GIVEN FIELD CONDITIONS, USING SUITABLE INGREDIENTS	BL3 APPLY
6	CE33C.6	EVALUATE PROPERTIES OF CONSTRUCTION MATERIALS VIZ. STEEL, BRICKS, TIMBER, TILES ETC. IN LABORATORY FOR THE QUALITY ASSURANCE	BL5 EVALUATE

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Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE33C.1	UNDERSTAND PROPERTIES AND ROLE OF INGREDIENTS LIKES CEMENT, AGGREGATE ETC. TO PRODUCE BETTER QUALITY CONCRETE.	BL2 UNDERSTAND
2	CE33C.2	DEMONSTRATE LABORATORY TESTING OF VARIOUS INGREDIENTS OF CONCRETE FOR DETERMINING THEIR PHYSICAL PROPERTIES	BL3 APPLY

3	CE33C.3	EXPLAIN PROPERTIES OF FRESH AND HARDENED CONCRETE AND APPLY THIS KNOWLEDGE ON FIELD.	BL2 UNDERSTAND
4	CE33C.4	SELECT APPROPRIATE TYPE OF CONCRETE, ADMIXTURE AND CHEMICALS FOR SPECIFIC REQUIREMENTS	BL4 ANALYZE
5	CE33C.5	DESIGN A CONCRETE MIX OF REQUIRED STRENGTH AND DURABILITY, FOR GIVEN FIELD CONDITIONS, USING SUITABLE INGREDIENTS	BL3 APPLY
6	CE33C.6	EVALUATE PROPERTIES OF CONSTRUCTION MATERIALS VIZ. STEEL, BRICKS, TIMBER, TILES ETC. IN LABORATORY FOR THE QUALITY ASSURANCE	BL5 EVALUATE

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR**

**COURSE CO INFORMATION REPORT**

**ACADEMIC YEAR: 2023-24**

**PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING**

**CLASS: SECOND YEAR**

**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: STRUCTURAL MECHANICS-I (CE35C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE35C.1	DISCUSS THE KNOWLEDGE OF STRUCTURAL MECHANICS TO DEPICT THE BEHAVIOR OF STRUCTURES.	BL2 UNDERSTAND
2	CE35C.2	CALCULATE PRINCIPAL PLANES AND FIND PRINCIPAL STRESSES.	BL3 APPLY
3	CE35C.3	APPLY THE KNOWLEDGE OF PRINCIPAL STRESSES FOR BENDING, TORSION, THRUST AND FAILURE ANALYSIS PROBLEMS	BL3 APPLY
4	CE35C.4	CONSTRUCT SHEAR FORCE DIAGRAMS AND BENDING MOMENT DIAGRAMS OF STATICALLY DETERMINATE BEAMS.	BL3 APPLY
5	CE35C.5	CALCULATE BENDING AND SHEAR STRESSES IN BEAMS.	BL3 APPLY
6	CE35C.6	ANALYZE THE BEHAVIOR OF STRUCTURE UNDER MOVING LOAD USING INFLUENCE LINE DIAGRAMS.	BL4 ANALYZE

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**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: SURVEYING & GEOMATICS (CE36L)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE36L.1	UNDERSTAND THE TEMPORARY ADJUSTMENTS OF MODERN SURVEYING EQUIPMENTS AND THE ATTRIBUTES OF LEADERSHIP, WORKING IN THE TEAM AND PROFESSIONAL ETHICS WHILE PERFORMING THE SURVEYING PROJECTS.	BL2 UNDERSTAND
2	CE36L.2	ILLUSTRATE THE USE OF THE SURVEYING INSTRUMENTS NAMELY LEVELS EDM, TOTAL STATION FOR SURVEYING MEASUREMENTS SUCH AS HORIZONTAL/ VERTICAL/INCLINED DISTANCE, HORIZONTAL/ VERTICAL ANGLES, BEARINGS, REDUCED LEVELS, AND COORDINATES.	BL3 APPLY
3	CE36L.3	USE THE INFORMATION OF MODERN SURVEYING TECHNIQUES NAMELY GLOBAL POSITIONING SYSTEM FOR CIVIL ENGINEERING APPLICATIONS.	BL3 APPLY
4	CE36L.4	USE THE MODERN SURVEYING TECHNIQUES NAMELY REMOTE SENSING FOR CIVIL ENGINEERING APPLICATIONS	BL3 APPLY
5	CE36L.5	DETERMINE THE USE OF MODERN SURVEYING TECHNIQUES LIKE GEOGRAPHIC INFORMATION SYSTEM FOR CIVIL ENGINEERING APPLICATIONS SUCH AS DEVELOP PLANS, DRAW MAPS AND DRAFT REPORTS FOR SURVEYING PROJECTS OF CIVIL ENGINEERING WORKS.	BL3 APPLY

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**DIVISION: A**

**COURSE: FLUID MECHANICS AND FLUID MACHINES (CE37L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE37L.1	DETERMINE THE FLUID PRESSURE BY USING VARIOUS PRESSURE MEASURING DEVICES AND COMPREHEND CONCEPT OF SUBMERGED & FLOATING STRUCTURES IN A STATIC FLUID.	BL2 UNDERSTAND
2	CE37L.2	VERIFY BERNOULLI'S THEOREM	BL2 UNDERSTAND
3	CE37L.3	CARRY OUT CALIBRATION OF DISCHARGE MEASURING EQUIPMENTS LIKE VENTURIMETER, ORIFICE, NOTCHES AND WEIRS.	BL2 UNDERSTAND
4	CE37L.4	DETERMINE THE LOSSES THROUGH PIPES.	BL2 UNDERSTAND
5	CE37L.5	EXPLAIN THE WORKING OF TURBINES AND PUMPS.	BL2 UNDERSTAND

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**DIVISION: A**

**COURSE: CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION (CE38L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE38L.1	UNDERSTAND PROPERTIES AND ROLE OF INGREDIENTS LIKES CEMENT, AGGREGATE ETC. TO PRODUCE BETTER QUALITY CONCRETE.	BL2 UNDERSTAND
2	CE38L.2	DEMONSTRATE LABORATORY TESTING OF VARIOUS INGREDIENTS OF CONCRETE FOR DETERMINING THEIR PHYSICAL PROPERTIES	BL3 APPLY
3	CE38L.3	EXPLAIN PROPERTIES OF FRESH AND HARDENED CONCRETE AND APPLY THIS KNOWLEDGE ON FIELD.	BL2 UNDERSTAND
4	CE38L.4	SELECT APPROPRIATE TYPE OF CONCRETE, ADMIXTURE AND CHEMICALS FOR SPECIFIC REQUIREMENTS	BL4 ANALYZE
5	CE38L.5	DESIGN A CONCRETE MIX OF REQUIRED STRENGTH AND DURABILITY, FOR GIVEN FIELD CONDITIONS, USING SUITABLE INGREDIENTS	BL3 APPLY

6	CE38L.6	EVALUATE PROPERTIES OF CONSTRUCTION MATERIALS VIZ. STEEL, BRICKS, TIMBER, TILES ETC. IN LABORATORY FOR THE QUALITY ASSURANCE	BL5 EVALUATE
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**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR**

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**ACADEMIC YEAR: 2023-24**

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**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: BUILDING CONSTRUCTION & DRAWING (CE39L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE39L.1	ELUCIDATE FUNCTIONAL REQUIREMENTS OF BUILDINGS AND TYPES OF FOUNDATION AND ITS SUITABILITY.	BL2 UNDERSTAND
2	CE39L.2	IDENTIFY VARIOUS TYPES OF BONDS SUCH AS ENGLISH, FLEMISH, STRETCHER AND HEADER BOND.	BL2 UNDERSTAND
3	CE39L.3	DRAW NEAT DRAWINGS OF DIFFERENT BUILDING COMPONENTS SUCH AS DOORS, WINDOWS, STAIRS ETC. WITH THE SUITABLE SCALE USING CAAD SOFTWARE	BL3 APPLY
4	CE39L.4	DRAW NEAT PERSPECTIVE VIEW DRAWINGS OF AN OBJECT AND GIVEN SMALL RESIDENTIAL BUILDING.	BL3 APPLY

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**SEMESTER: SEMESTER I**

**DIVISION: A**

**COURSE: LAB PRACTICE (CE410L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE410L.1	DEMONSTRATE BASIC CONCEPTS OF THE AUTOCAD SOFTWARE.	BL1 REMEMBER



2	CE410L.2	APPLY BASIC CONCEPTS TO DEVELOP ARCHITECTURAL FLOOR PLAN OF SMALL RESIDENTIAL BUILDING.	BL3 APPLY
3	CE410L.3	UNDERSTAND GEOMETRIC CONSTRUCTION, MULTI-VIEW, DIMENSIONING AND DETAILED DRAWING OF TYPICAL 2-D ENGINEERED OBJECT.	BL2 UNDERSTAND
4	CE410L.4	PRODUCE VIEWS LIKE ELEVATION, SECTION , FURNITURE PLAN FOR SMALL RESIDENTIAL BUILDING.	BL4 ANALYZE
5	CE410L.5	UNDERSTAND AND DEMONSTRATE DIMENSIONING CONCEPTS AND TECHNIQUES FOR CIVIL ENGINEERING DRAWING.	BL2 UNDERSTAND
6	CE410L.6	PRODUCE TEMPLATE DRAWING.	BL4 ANALYZE

**CLASS: SECOND YEAR SEMESTER: SEMESTER II**

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**CLASS: SECOND YEAR**

**SEMESTER: SEMESTER II**

**DIVISION: A**

**COURSE: ENVIRONMENTAL ENGINEERING-I (CE41C)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE41C.1	EXAMINE VARIOUS DRINKING WATER QUALITY PARAMETERS AND FORECAST THE POPULATION OF THE CITY.	BL2 UNDERSTAND
2	CE41C.2	DESIGN INTAKES AND WATER CONVEYANCE SYSTEM BASED ON WATER DEMAND.	BL3 APPLY
3	CE41C.3	DESIGN AERATION UNIT AND SETTLING UNIT ON THE BASIS OF RAW WATER QUALITY & WATER DEMAND	BL3 APPLY
4	CE41C.4	DESIGN FILTRATION UNIT AND DISINFECTION UNIT ON THE BASIS OF RAW WATER QUALITY & WATER DEMAND.	BL3 APPLY
5	CE41C.5	APPLY KNOWLEDGE OF ADVANCED WATER TREATMENT PROCESSES FOR INDIVIDUAL WATER PURIFICATION UNITS.	BL3 APPLY
6	CE41C.6	PLAN AND DESIGN WATER DISTRIBUTION SYSTEMS	BL3 APPLY

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR****COURSE CO INFORMATION REPORT****ACADEMIC YEAR: 2023-24****PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING****CLASS: SECOND YEAR****SEMESTER: SEMESTER II****DIVISION: A****COURSE: BUILDING PLANNING & DESIGN (CE42C)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE42C.1	PREPARE PLAN OF RESIDENTIAL AND PUBLIC BUILDINGS, ACCORDING TO THE PREVALENT BUILDING BYELAWS	BL3 APPLY
2	CE42C.2	PREPARE 'MUNICIPAL BUILDING PERMISSION DRAWINGS' OF RESIDENTIAL BUILDINGS USING CADD SOFTWARE TOOLS	BL3 APPLY
3	CE42C.3	PREPARE PLAN OF APPROPRIATE BUILDING SERVICES AND RAINWATER HARVESTING SYSTEM FOR A BUILDING	BL3 APPLY
4	CE42C.4	EXPLAIN CONCEPT OF GREEN BUILDING AND LOW COST HOUSING	BL2 UNDERSTAND
5	CE42C.5	DESCRIBE APPROPRIATE ACOUSTICS, SOUND INSULATION AND FIRE FIGHTING ARRANGEMENTS FOR A BUILDING	BL2 UNDERSTAND
6	CE42C.6	DESCRIBE APPROPRIATE FIRE FIGHTING ARRANGEMENT FOR A BUILDING	BL2 UNDERSTAND

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR****COURSE CO INFORMATION REPORT****ACADEMIC YEAR: 2023-24****PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING****CLASS: SECOND YEAR****SEMESTER: SEMESTER II****DIVISION: A****COURSE: STRUCTURAL MECHANICS-II (CE43C)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE43C.1	SOLVE THE PROBLEMS OF COLUMNS WITH DIFFERENT LOADING CONDITIONS	BL3 APPLY
2	CE43C.2	CALCULATE SLOPE AND DEFLECTION OF BEAMS UNDER DIFFERENT LOADING CONDITIONS	BL3 APPLY

3	CE43C.3	SOLVE THE PROBLEMS OF DETERMINATE ARCHES	BL3 APPLY
4	CE43C.4	CALCULATE THE DEGREE OF STATIC AND KINEMATIC INDETERMINANCY	BL3 APPLY
5	CE43C.5	ANALYSE INDETERMINATE BEAMS AND FRAMES USING FORCE METHOD	BL4 ANALYZE
6	CE43C.6	ANALYSE INDETERMINATE BEAMS AND FRAMES USING DISPLACEMENT METHOD	BL4 ANALYZE

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**SEMESTER: SEMESTER II**

**DIVISION: A**

**COURSE: ENGINEERING MATHEMATICS-III (CE44B)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE44B.1	APPLY CONCEPTS OF HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS TO SOLVE BENDING RELATED PROBLEMS.	BL3 APPLY
2	CE44B.2	SOLVE PARTIAL DIFFERENTIAL EQUATION OF FIRST ORDER.	BL3 APPLY
3	CE44B.3	SOLVE THE PROBLEMS ON FOURIER SERIES.	BL3 APPLY
4	CE44B.4	APPLY LAPLACE TRANSFORMS TO SOLVE LINEAR DIFFERENTIAL EQUATIONS.	BL3 APPLY
5	CE44B.5	UNDERSTAND THE CONCEPTS OF CORRELATION AND REGRESSION.	BL2 UNDERSTAND
6	CE44B.6	UNDERSTAND VARIOUS PROBABILITY DISTRIBUTION FUNCTIONS.	BL2 UNDERSTAND

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**CLASS: SECOND YEAR**

**SEMESTER: SEMESTER II**

**DIVISION: A**

**COURSE: ENGINEERING GEOLOGY (CE45B)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE45B.1	TO DESCRIBE ISSUES CONCERNING THE GEOLOGICAL FORMATIONS AND GEOLOGICAL STRUCTURE OF A REGION	BL1 REMEMBER, BL2 UNDERSTAND
2	CE45B.2	TO DISTINGUISH THE CHARACTERISTICS OF THE MOST IMPORTANT GEOLOGICAL FORMATIONS AND PROBLEMS THAT MAY ARISE IN THE VARIOUS CIVIL ENGINEERING PROJECTS IN SUCH FORMATIONS.	BL1 REMEMBER, BL2 UNDERSTAND
3	CE45B.3	TO INTERPRET AND EXPLAIN THE GEOLOGICAL STRUCTURES IN THE GEOLOGICAL MAPS AND CROSS SECTIONS.	BL1 REMEMBER, BL2 UNDERSTAND, BL3 APPLY
4	CE45B.4	TO ASSESS AND APPROPRIATELY ADJUST THE RESULTS OF GEOLOGICAL STUDY IN ORDER TO ASCERTAIN SECURE CONSTRUCTION AND OPERATION OF A CIVIL ENGINEERING PROJECTS LIKE DAMS, RESERVOIRS HILLY ROADS AND RAILWAY TRACKS.	BL1 REMEMBER, BL2 UNDERSTAND, BL3 APPLY, BL4 ANALYZE
5	CE45B.5	TO RECEIVE, ANALYZE AND EVALUATE DATA AND APPROPRIATELY AND SOLVE TECHNICAL AS WELL AS GROUND WATER RELATED PROBLEMS.	BL3 APPLY, BL4 ANALYZE, BL5 EVALUATE

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**CLASS: SECOND YEAR**

**SEMESTER: SEMESTER II**

**DIVISION: A**

**COURSE: ENVIRONMENTAL ENGINEERING-I (CE46L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE46L.1	EXAMINE VARIOUS DRINKING WATER QUALITY PARAMETERS AND FORECAST THE POPULATION OF THE CITY.	BL3 APPLY
2	CE46L.2	DESIGN AERATION UNIT AND SETTLING UNIT ON THE BASIS OF RAW WATER QUALITY AND WATER DEMAND.	BL3 APPLY

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**ACADEMIC YEAR: 2023-24**

**PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING****CLASS: SECOND YEAR****SEMESTER: SEMESTER II****DIVISION: A****COURSE: BUILDING PLANNING & DESIGN (CE47L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE47L.1	PREPARE PLAN OF RESIDENTIAL AND PUBLIC BUILDINGS, ACCORDING TO THE PREVALENT BUILDING BYELAWS	BL2 UNDERSTAND, BL3 APPLY
2	CE47L.2	PREPARE 'MUNICIPAL BUILDING PERMISSION DRAWINGS' OF RESIDENTIAL BUILDINGS USING CADD SOFTWARE TOOLS	BL2 UNDERSTAND, BL3 APPLY
3	CE47L.3	PREPARE PLAN OF APPROPRIATE BUILDING SERVICES AND RAINWATER HARVESTING SYSTEM FOR A BUILDING	BL2 UNDERSTAND, BL3 APPLY

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR****COURSE CO INFORMATION REPORT****ACADEMIC YEAR: 2023-24****PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING****CLASS: SECOND YEAR****SEMESTER: SEMESTER II****DIVISION: A****COURSE: COMPUTER PROGRAMMING & NUMERICAL METHODS (CE48L)**

Sr. No.	CO Code	CO Statements	Bloom's Level
1	CE48L.1	DEVELOP COMPUTER ALGORITHMS FOR SOLVING CIVIL ENGINEERING PROBLEMS.	BL3 APPLY
2	CE48L.2	UNDERSTAND MULTI-DIMENSIONAL ARRAYS BY USING PROGRAMMING LANGUAGE.	BL2 UNDERSTAND
3	CE48L.3	UNDERSTAND THE PRINCIPLES OF NUMERICAL METHODS USEFUL FOR CIVIL ENGINEERING PROBLEMS.	BL2 UNDERSTAND
4	CE48L.4	SOLVE THE NUMERICAL INTEGRATION USING COMPUTER PROGRAM IN C LANGUAGE.	BL3 APPLY
5	CE48L.5	SOLVE ORDINARY DIFFERENTIAL EQUATIONS USING COMPUTER PROGRAM IN C LANGUAGE.	BL3 APPLY
6	CE48L.6	ILLUSTRATE COMPUTER PROGRAM FOR CIVIL ENGINEERING BASED PROBLEMS USING STATISTICAL ANALYSIS.	BL2 UNDERSTAND

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR****COURSE CO INFORMATION REPORT****ACADEMIC YEAR: 2023-24****PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING****CLASS: SECOND YEAR****SEMESTER: SEMESTER II****DIVISION: A****COURSE: ENGINEERING GEOLOGY (CE49L)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
1	CE49L.1	TO DESCRIBE ISSUES CONCERNING THE GEOLOGICAL FORMATIONS AND GEOLOGICAL STRUCTURE OF A REGION	BL1 REMEMBER, BL2 UNDERSTAND
2	CE49L.2	TO DISTINGUISH THE CHARACTERISTICS OF THE MOST IMPORTANT GEOLOGICAL FORMATIONS AND PROBLEMS THAT MAY ARISE IN THE VARIOUS CIVIL ENGINEERING PROJECTS IN SUCH FORMATIONS.	BL1 REMEMBER, BL2 UNDERSTAND
3	CE49L.3	TO INTERPRET AND EXPLAIN THE GEOLOGICAL STRUCTURES IN THE GEOLOGICAL MAPS AND CROSS SECTIONS.	BL1 REMEMBER, BL2 UNDERSTAND, BL3 APPLY
4	CE49L.4	TO ASSESS AND APPROPRIATELY ADJUST THE RESULTS OF GEOLOGICAL STUDY IN ORDER TO ASCERTAIN SECURE CONSTRUCTION AND OPERATION OF A CIVIL ENGINEERING PROJECTS LIKE DAMS, RESERVOIRS HILLY ROADS AND RAILWAY TRACKS.	BL1 REMEMBER, BL2 UNDERSTAND, BL3 APPLY
5	CE49L.5	TO RECEIVE, ANALYZE AND EVALUATE DATA AND APPROPRIATELY AND SOLVE TECHNICAL AS WELL AS GROUND WATER RELATED PROBLEMS.	BL3 APPLY, BL4 ANALYZE, BL5 EVALUATE

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR****COURSE CO INFORMATION REPORT****ACADEMIC YEAR: 2023-24****PROGRAM: UNDER GRADUATE IN CIVIL ENGINEERING****CLASS: SECOND YEAR****SEMESTER: SEMESTER II****DIVISION: A****COURSE: DESIGN THINKING (HN411)**

<b>Sr. No.</b>	<b>CO Code</b>	<b>CO Statements</b>	<b>Bloom's Level</b>
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1	HN411.1	UNDERSTAND THE PRINCIPLES AND SKILLS FOR CRITICAL DESIGN THINKING.	BL2 UNDERSTAND
2	HN411.2	DETERMINE CUSTOMER NEEDS AND PRODUCT SPECIFICATIONS.	BL3 APPLY
3	HN411.3	APPLY CREATIVITY AND PROTOTYPING IN PRODUCT DEVELOPMENT.	BL3 APPLY
4	HN411.4	APPLY DESIGN THINKING FOR SERVICE SECTOR PROBLEM	BL3 APPLY
5	HN411.5	EXPLAIN PRODUCT ARCHITECTURE AND FINANCE.	BL2 UNDERSTAND
6	HN411.6	APPLY DESIGN FOR ENVIRONMENT PRINCIPLES TO A PRODUCT LIFE CYCLE.	BL2 UNDERSTAND

**Dissemination of Programmes  
Outcomes and Course Outcomes to  
Teachers and Students**





# SVERI's College of Engineering, Pandharpur

## Department of Civil Engineering



### Vision

### Mission

### Programme Educational Objectives (PEOs)

### Programme Outcomes (POs)

#### INSTITUTE

To be nationally recognized among the best institutes in India for excellence in technical education.

- To impart value-based technical education through innovation and excellence, empowering individuals to become leaders in their fields to create positive impact.
- To create an ambiance of academic excellence, research, and life skills by fostering a learning environment that empowers individuals to achieve their full potential.
- To foster strong relationships amongst all our stakeholders by inculcating a personal touch and mutual respect in all our interactions.

#### DEPARTMENT

To be nationally recognized for excellence in education strengthened with innovation, research and industry-institute interaction in the field of Civil Engineering.

- To impart value-based education in Civil Engineering, through effective teaching and learning approaches.
- To create an ambiance for academic excellence through fruitful interaction among various stakeholders.
- To inculcate best practices for innovative research, competitive employability and sustainable entrepreneurship development.

#### The Department of Civil Engineering has as its PEOs to produce graduate who:

1. Function successfully in a professional environment through use of appropriate technology towards holistic development of urban and rural amenities and infrastructure with consideration of safety, sustainability, economical feasibility and environmental impact related issues.
2. Demonstrate leadership, professional ethics, project management and finance related attributes as employees or employers.
3. Demonstrate strong communication in the society and leadership skills and contribute at individual as well as multidisciplinary team levels.
4. Engage in enrichment of knowledge and skills through lifelong learning to evolve innovative solutions in Civil Engineering.
5. Demonstrate a sense of ethical and societal responsibility in various sectors such as water supply, sanitation, transportation, irrigation, disaster mitigation, etc.

#### Programme Specific Outcomes (PSOs)

- Civil Engineering Graduates will be able to:**
1. Design various Civil Engineering structures, components or processes to meet desired needs within the realistic constraints such as economic, environmental, social, regulatory, ethical, health, safety, manufacturability and sustainability.
  2. Conduct laboratory experiments and critically analyze to interpret data related to soil mechanics, fluid mechanics, environmental and civil engineering materials.
  3. Use the techniques, skills, and modern software tools necessary for profession particularly in the areas of environmental / water resources, geotechnical, structural and transportation engineering.

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **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.
4. **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.
5. **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.
6. **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.
7. **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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **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.

## Introduction of Sub-Teacher.

Name : Dr. S. P. Patil.

Sub Name : Earthquake Engineering.

Qualification : Mtech (Structure)  
PhD in Civil Engg.

Teaching Experience : 11 years.

Subject taught : CT, ACT, GT-I, GT-II, TE-I,  
TE-II, BCE, EQ, SDMB,  
ACC, RHE, TE&C, PORCC,

MoNo : 9922647936

Email Id : sppatil@coe.sveri.ac.in.

Publications : More than 15 papers published  
in different journals.

Patents : 2 Patents published.

*S.P.*  
21/8/2023

Sign of Sub-Teacher  
[Dr. S. P. Patil]

*G. G. Falmari*

Sign of Class-co-ordinator  
[Prof. G. G. Falmari]

## Institute Vision .

To be nationally recognized among the best institute in India for excellence in technical education .

## Institute Mission .

- 1) To impart value based technical education through innovation & excellence, empowering individuals to become leaders in their fields to create positive impact.
- 2) To create an ambiance of academic excellence, research and life skills by fostering a learning environment that empowers individuals to achieve their full potential.
- 3) To foster strong relationships among all our stakeholders by inculcating a personal touch and mutual respect in all our interactions.

## Department Vision

To be nationally recognized for excellence in education strengthened with innovation, research, and industry-institute interaction in the field of Civil engineering.

## Department Mission.

- (1) To impart value based education in civil engineering through effective teaching & learning approaches.
- (2) To create ambiance for academic excellence through fruitful interaction among various stakeholders.
- (3) To inculcate best practices for innovative research, competitive employability & sustainable entrepreneurship development.

## Programme Outcomes.

- 1) Engineering knowledge.
- 2) Problem analysis.
- 3) Design & Development of solutions.
- 4) Conduct laboratory investigations of complex problems.
- 5) Modern tool usage.
- 6) The Engineer & Society.
- 7) Environment & Sustainability.
- 8) Ethics.
- 9) Individual & Teamwork.
- 10) Communication.
- 11) Project management & Finance.
- 12) Lifelong learning.

## Programme Educational Outcomes:

- 1) functions successfully in professional environment through the use of appropriate technology.

- 2) Demonstrate leadership, professional ethics, project management and finance related attributes as employee or employers.
- 3) Demonstrate strong communication in the society and leadership skills & contribute at individual as well as multidisciplinary team levels.
- 4) Engage in enrichment of knowledge and skills through lifelong learning to evolve innovative solutions in civil engg.
- 5) Demonstrate a sense of ethical and societal responsibility in various sectors such as water supply, sanitation, transportation, irrigation, disaster mitigation etc.

### Programme Specific Outcomes:

- 1) Design various civil engg. structures, components / processes to meet desired needs within the realistic constraints such as economic, environmental, social, regulatory, ethical, health, safety, manufacturability & sustainability.
- 2) Conduct laboratory experiments and critically analyse to interpret data related to soil mechanics, fluid mechanics, environment & civil engg. materials.

3) Use the techniques, skills & modern software tools necessary for profession, particularly in the areas of environmental / water resources, geotechnical, structural & transportation engg.

B4. About title of the subject.

Earthquake Engg.

Earthquake - Series of vibrations caused in Earth crust because of rupture of rocks or rebound with strain in rock.

Engineering: The art of converting scientific knowledge into practical applications.

Earthquake Engg - It is the branch of CE where effect of Earthquake on various structures will be studied.

B5. About Central Idea of Subject.

First section can be divided in the parts where 1<sup>st</sup> part cover elements of seismology, II<sup>nd</sup> part cover the basic dynamics whereas last part links the dynamics with the civil engg. structures & random coming from Earthquake.

Second Section of subject is focused on building planning aspect of civil engg. from earthquake point of view load estimation on building structures with Earthquake. Ductile detailing of RCC structures & intensity concludes with Earthquake Resistant Construction.

## \* Handwritten Syllabus of the Subject.

- Teaching Scheme :  
Lectures : 2 hrs/week - 2 credits
- Examination Scheme :  
ISE - 30 Marks.  
ESE - 70 Marks.

## B7 Course Outcomes :-

At the end of course, students will be able to

- 1) Explain the concept of seismology.
- 2) Analyse SDOF System (Single Degree of Freedom System) for free and forced vibration.
- 3) Dynamic analysis of structure by response spectrum theory for various loading conditions.
- 4) Incorporate earthquake resistant features for various types of constructions.
- 5) Adopt codal provision of IS 1893-2019 and IS 13920-2016 for evaluation of seismic forces and ductile detailing of RCC members.
- 6) Explain the various philosophies of failure of earthquake resistant construction.

## SECTION - 1

## Unit No. 01 : Elements Of Seismology.

General effect of an earthquake, terminology, structure of earth, causes of an earthquake, Plate tectonic theory, Seismic Waves,



magnitude and intensity, methods of measurement, energy released, seismograph, strong motion earthquake, accelerogram, soil liquefaction, prominent earthquakes of India.

### Unit No. 02: Free vibrations of Single Degree OF freedom System.

Dynamic loads and dynamic analysis, Degree of freedom, undamped free vibrations, multiple elastic forces, viscously damped vibrations, eqn of motion & solution, logarithmic decrement.

### Unit No. 03: Forced vibrations of Single Degree of freedom System.

forced vibrations (Harmonic loading) of single degree of freedom System. Undamped & viscously damped vibrations, eqn of motion & solut<sup>n</sup>, force transmitted to foundation, transmissibility, Response to harmonic support excitation

### Unit No. 04: Response Spectrum theory.

Response to general dynamic loading, Duhamels integral, Rectangular loading, Earthquake Response Spectrum, Tripartite spectrum, construction of design response spectrum.

## Section-II

### Unit No. 05 : Principles of Earthquake Resistant Design.

Planning aspect, symmetry, simplicity, regularity, resistance of structural elements and structures for dynamic load, Design Criteria, Strength & Deflect

### Unit No. 06 : Evaluation of Seismic Forces.

Philosophy of earthquake Resistant Design, Provision of IS 1893 all parts, Soft storey Design spectrum of IS-1893-2016, Evaluation of lateral loads for Earthquake on multi-storeyed building, concept of ductility different ways of measuring ductility factors affecting ductility, Provision of IS 13930 - 2016.

### Unit No. 07 : Earthquake Resistant Construction.

Failure mechanism of different types of masonry construction, construct<sup>n</sup> aspect of masonry or timber structures, retrofitting & strengthening of low cost & low rise buildings, provision of IS 4236 & IS 13935.

#### Textbooks:

- 1) Elements of Earthquake Engineering - Jaykrishna - South asian publication.

- 2) Earthquake Resistance masonry and timber structure.
- 3) Earthquake Resistant Design of RCC structures - S.K. Ghosh.

### Reference Books :

- 1) Dynamics of Structure - A.K. Chopra.
- 2) Structural Dynamics - Maripaz, CBS Publication.
- 3) Earthquake Resistance structures - Dowrick - John Wiley Publication.
- 4) IS - 1893-2016 Part - 1, IS - 13920 - 2016, IS - 4326 and IS 13935
- 5) Manual of Earthquake Resistant Non-Engineering constructions - University of Roorkee

Unit No. 01 : Elements of  
Seismology.

classmate

Date 2/8/23  
Page \_\_\_\_\_

C1. \*

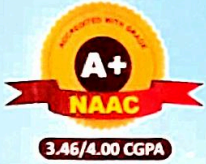
Syllabus :-

General effect of an Earthquake, terminology, structure of earth, causes of an earthquake, Plate tectonic theory, seismic waves, magnitude & intensity, methods of measurement energy released, seismograph, strong motion earthquake, accelerogram, soil liquefaction, prominent Earthquakes of India.

C2.

MCQ / Assignment.

- 1) Earthquakes can occur with — faulting
  - 1) Normal
  - 2) Reverse
  - 3) Thrust
  - 4) All of the above.
- 2) Body waves consist of the ----
  - 1) P wave only
  - 2) S only waves
  - 3) P and S waves
  - 4) Surface waves.
- 3) In general most destructive earthquake waves are —
  - 1) P waves
  - 2) S waves.
  - 3) Surface waves
  - 4) Q waves.
- 4) The amount of ground displacement in earthquake is called —.
  - 1) Epicentre
  - 2) Dip.
  - 3) Slip
  - 4) Focus
- 5) The min<sup>m</sup> no. of seismic stations needed to locate an earthquake is ----.
  - 1) 8
  - 2) 2
  - 3) 3
  - 4) 1



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# SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR



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Contact No.: 9545553888, 9545553737, E-mail: coe@sveri.ac.in, Website: www.sveri.ac.in  
Approved by A.I.C.T.E., New Delhi, Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur  
NAAC A+ with 3.46 CGPA out of 4.00, An ISO 9001: 2015 Certified Institute,  
Accredited by the Institution of Engineers, Kolkata and TCS, Pune.

## ASSIGNMENTS / TUTORIALS BOOK

Name: Prapti Dattatray Bhong Exam Seat No.: \_\_\_\_\_

Class: Sy Btech Semester: IV Roll No.: 03

Subject: DT



## **SVERI's COLLEGE OF ENGINEERING PANDHARPUR**

### **Our Vision:**

- To be nationally recognized among the best institutes in India for excellence in technical education.

### **Our Mission:**

- To impart value-based technical education through innovation and excellence, empowering individuals to become leaders in their fields to create positive impact.
- To create an ambiance of academic excellence, research, and life skills by fostering a learning environment that empowers individuals to achieve their full potential.
- To foster strong relationships amongst all our stakeholders by inculcating a personal touch and mutual respect in all our interactions.

### **Objectives:**

**We are committed to fulfill following Objectives:**

- To achieve a status of premier technological institute.
- To achieve excellence on Academic, Administrative and Personality Development fronts through our own channelized pattern of teaching learning process.
- To develop the state of the Art, Research, Development and consultancy cell.
- To strengthen industry Institute Interaction to provide industrial exposure to the students and upgradation of faculty knowledge about advanced trends.

### **Quality Policy:**

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- By effective implementation of teaching-learning process.
- By establishing respectful and pleasant behavior with the students and inculcation of culture of patience and co-operation.
- By providing ample opportunities for personality development.
- By creating environment conducive to learning.

**(Dr. B. P. RONGE)  
PRINCIPAL**

# INDEX

## (Assignment / Tutorial Book Assessment)

Sr. No.	Title of Assignment / Tutorial	Page No.	CO	Date		Marks (25)			Total Marks (25)	Sign.
				Given	Checked	Timely Submission (10)	Presentation (10)	Oral (5)		
1)	Design thinking skills-	1-5	CO1	4-24	12-2	10	10	4	24	<del>Nishu</del> 12/12/24
2)	customer need and product specification	6-12	CO2	8-2	26-2	10	10	4	24	<del>Nishu</del> 12/02/24
3)	Creativity & prototyping	13-16	CO3	4-3	8-4	10	10	4	24	<del>Nishu</del> 12/04/24
4)	Products Architecture & financial Analysis	19-21	CO5	5-4	12-4	10	10	4	24	<del>Nishu</del> 12-5-24
5)	Design for environment	22-25	CO6	20-4	30-4	10	10	5	25	<del>Nishu</del> 30-4-24
6)	Design for service	26-30	CO4	26-4	2-05	08	10	5	23	<del>Nishu</del> 12-5-05-24

### CERTIFICATE

This is certify that Mr. / Miss. / Mrs. Bhong Prapti Dattatray of Class 8y Division A Roll No 03 Semester IV has satisfactorily completed Assignments/Tutorials in DT during the academic year 2023-24

Date : 9/5/24  
Subject Teacher

Sahil  
11/5  
Head of Department

B-Ranje  
Principal

CO No.	CO Statement	BL	PI Code
Hn411.1	Understand the principals and skills for critical	BL2	3-1-1 10-1-1
Hn411.2	Determine customer needs and product specification	BL3	2-1-1 3-1-1 9-1-1 10-1-1
Hn411.3	Apply Creativity and prototyping in product development	BL3	3-1-1 9-1-1 10-1-1
Hn411.4	Apply design thinking for service sector problem	BL3	3-1-1
Hn411.5	explain product architecture & finance	BL2	3-1-1
Hn411.6	Apply design for environment principle to product life cycle	BL3	3-1-1 7-1-1 7-2-1



# Department of Civil Engineering

## Vision

- To be nationally recognized for excellence in education strengthened with innovation, research and industry-institute interaction in the field of Civil Engineering.

## Mission

- To impart value-based education in Civil Engineering, through effective teaching and learning approaches.
- To create ambience for academic excellence through fruitful interaction among various stakeholders.
- To inculcate best practices for innovative research, competitive employability and sustainable entrepreneurship development.

## Programme Educational Objectives (PEOs)

**The Department of Civil Engineering has its PEOs to produce graduates who:**

- Function successfully in a professional environment through use of appropriate technology towards holistic development of urban and rural amenities and infrastructure with consideration of safety, sustainability, economical feasibility and environmental impact related issues.
- Demonstrate leadership, professional ethics, project management and finance related attributes as employees or employers.
- Demonstrate strong communication in the society and leadership skills and contribute at individual as well as multi disciplinary team levels.
- Engage in enrichment of knowledge and skills through life-long learning to evolve innovative solutions in Civil Engineering.
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**Civil Engineering Graduates will be able to:**

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# SVERI's College of Engineering, Pandharpur

## PROGRAMME OUTCOMES (POs)

(As per New SAR Format of NBA)

Engineering Graduates will be able to:

<b>Engineering knowledge</b>	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>Problem analysis</b>	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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<b>Life-long learning</b>	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.

## NBA Accreditation

"All eligible UG Programs are accredited by the "National Board of Accreditation (NBA)", the highest accrediting body for the International Quality Standards in Engineering up to "June 2020"."



Shri Vitthal Education & Research Institute's

### COLLEGE OF ENGINEERING, PANDHARPUR



P.B.No.54, Gopalpur - Ranjani Road, Gopalpur, Pandharpur - 413304, District: Solapur (Maharashtra)  
Tel.: (02186) 216063, 9503103757, Toll Free No.: 1800-3000-4131 e-mail.: [coe@sveri.ac.in](mailto:coe@sveri.ac.in)  
Website.: [www.sveri.ac.in](http://www.sveri.ac.in) (Approved by A.I.C.T.E., New Delhi and Affiliated to Solapur University, Solapur)  
NBA Accredited all eligible UG Programmes, NAAC Accredited Institute, ISO 9001:2015 Certified Institute.  
Accredited by The Institution of Engineers (India), Kolkata and TCS, Pune.

### LAB WORKBOOK

Name Ambure Snehal Shankar Exam. Seat No. \_\_\_\_\_

Class Last year. Semester VII<sup>th</sup> Roll No. 01

Subject Estimation, costing and valuation



*Engineering for Excellence*

## **SVERI's COLLEGE OF ENGINEERING PANDHARPUR**

### **OUR VISION**

To be nationally recognized among the best institutes in India for excellence in technical education.

### **OUR MISSION**

To impart value added technical education through ambiance of academic excellence, research and life - skills by inculcating personal touch and respect in relationship amongst the stakeholders.

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**(Dr. B. P. RONGE)**  
**PRINCIPAL**

**INDEX**  
(Laboratory Book Assessment)

Sr. No.	Title of Experiment	Page No.	CO	Date of Expt.		Marks (25)					Total (25)	Sign.
				Performed	Submitted	Attendance (S)	Performance (S)	Submission (S)	Presentation (S)	Oral (S)		
1.	Reading Drawing	01	CETIC-1	13/09	20/9	5	5	5	3	3	21	
2.	Market survey	14	CETIC-2	22/09	27/9	5	5	5	3	3	21	
3.	specification	20	CETIC-1	04/10	13/10	5	5	5	4	3	22	
4.	Rate analysis	27	CETIC-3	17/10	28/10	5	5	5	5	4	24	
			3									

**CERTIFICATE**

This is certify that Mr. / Miss. / Mrs. Ambure Snehal Shankar of  
 Class B.Y. Division A Roll No 01 Semester VII<sup>th</sup> has completed satisfactorily  
 Experiments in Estimation, costing during the academic year 2023/24  
 and valuation

Date:   
 Subject Teacher

Head of Dept.

Principal -



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