



**Government of Karnataka**  
**Department of Collegiate and Technical Education**

**C-20 Second Year Diploma Curriculum**  
**Civil Engineering**

Curriculum Development Cell, DTE  
2021-22



Government of Karnataka  
DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION  
Curriculum Structure

III Semester Scheme of Studies- Diploma in Civil Engineering

Sl. No.	Course Category / Teaching Department	Course Code	Course Name	Hours per week			Total contact hrs /week	Credits	CIE Marks		SEE Marks		Total Marks	Min Marks for Passing (including CIE marks)	Assigned Grade	Grade Point	SGPA and CGPA
				L	T	P			Max	Min	Max	Min					
<b>Integrated Courses</b>																	
1	PC/CE	20CE31P	Engineering Mechanics and Strength of materials	3	1	4	8	6	60	24	40	16	100	40			Both SGPA & CGPA
2	PC/CE	20CE32P	Modern Surveying	3	1	4	8	6	60	24	40	16	100	40			
3	PC/CE	20CE33P	Construction Techniques	3	1	4	8	6	60	24	40	16	100	40			
4	PC/CE	20CE34P	Building Drawing using CADD	3	1	4	8	6	60	24	40	16	100	40			
<b>Audit Course</b>																	
5	AU/KA	20KA31T	ಸಾಹಿತ್ಯ ಸಿಂಚನ-II/ ಬಳಕೆ ಕನ್ನಡ-II	2	0	0	2	2	50	20	-	-	50	20			
<b>Total</b>				<b>14</b>	<b>4</b>	<b>16</b>	<b>34</b>	<b>26</b>	<b>290</b>	<b>116</b>	<b>160</b>	<b>64</b>	<b>450</b>	<b>180</b>			

\*PC: Programme Core:: AU-Audit Course:: KA: Kannada:: L: Lecture:: T: Tutorial:: P: Practice



**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**  
**Curriculum Structure**

**IV Semester Scheme of Studies- Diploma in Civil Engineering**

Sl. No.	Course Category / Teaching Department	Course Code	Course Name	Hours per week			Total contact hrs /week	Credits	CIE Marks		SEE Marks		Total Marks	Min Marks for Passing (including CIE marks)	Assigned Grade	Grade Point	SGPA and CGPA
				L	T	P			Max	Min	Max	Min					
<b>Integrated Courses</b>																	
1	PC/CE	20CE41P	Concrete Technology	3	1	4	8	6	60	24	40	16	100	40			<b>Both SGPA &amp; CGPA</b>
2	PC/CE	20CE42P	Building Estimating and valuation	3	1	4	8	6	60	24	40	16	100	40			
3	PC/CE	20CE43P	Site Management	3	1	4	8	6	60	24	40	16	100	40			
4	PC/CE	20CE44P	Design and detailing of RCC structures	3	1	4	8	6	60	24	40	16	100	40			
<b>Audit Course</b>																	
5	AU/CE	20CE45T	Indian Constitution	2	0	0	2	2	50	20	-	-	50	20			
<b>Total</b>				<b>14</b>	<b>4</b>	<b>16</b>	<b>34</b>	<b>26</b>	<b>290</b>	<b>116</b>	<b>160</b>	<b>64</b>	<b>450</b>	<b>180</b>			

\*PC: Programme Core:: AU-Audit Course:: L: Lecture:: T: Tutorial:: P: Practice

# **3<sup>RD</sup> SEMESTER**



**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	Third Semester
<b>Course Code</b>	20CE31P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Engineering Mechanics & Strength of Materials	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L:T:P :: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale:** The study of strength of materials often refers to various methods of calculating the stresses and strains in structural members such as beams, columns and shafts. The methods employed to predict the response of a structure under loading and its susceptibility to various failure modes takes into account the properties of the materials such as its yield strength, ultimate strength, Young's modulus, and Poisson's ratio. In addition, the mechanical elements, geometric properties such as its length, width, thickness, boundary constraints and abrupt changes in geometry such as holes are considered.

**2. Course Outcomes/Skill Sets:** At the end of this course students will be able to:

CO-01	Explain the potential impact of forces / stresses on structural elements / materials in a given condition.
CO-02	Calculate the moment of Inertia for a given symmetrical or asymmetrical geometric sections.
CO-03	Calculate shear force and bending moments for different loading conditions and support conditions, draw the SFD & BMD and validate the analysis using Ansys software.
CO-04	Calculate bending and shear stresses in beams under different load conditions and validate the analysis using Ansys software.
CO-05	Calculate and validate the safety of a column for various given loads and end conditions.

**3. Course Content**

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week(2 hours/batch twice in a week)
1	1	1, 2	1.Force and characteristics of a force. Force system: Classification of force system according to plane		1 & 2. Verification of lami's Theorem.

			<p>and line of action- Principle of transmissibility of forces, moment of a force, Resolution &amp; composition of forces.</p>	<p>1.Determine Forces in members of a truss at the given joint.</p>	
			<p>2. Resultant force, Law of moments, Resultant of Concurrent and non-concurrent force system. Equilibrium conditions.</p>	<p>2.Determination of resultant of forces acting on retaining wall and trapezoidal dam section.</p>	
			<p>3.Simple Problems on determination of resultant of con current &amp; non concurrent force systems.</p>		
2	1	1, 2	<p>1.Rigid body, plastic body Mechanical properties of metal- Rigidity, Elasticity, Plasticity.</p>	<p>1. Compare the properties of Hard, soft, brittle and Ductile material.</p>	<p>1. Hardness test to evaluate a hardness of given material Example: Mild Steel, Stainless steel, Wood, Copper, Bronze, Brass, Aluminium, Glass.</p>
			<p>2.Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility</p>		<p>2. Impact test to evaluate toughness of a given material Example: Mild Steel, Stainless steel, Wood, Copper, Bronze, Brass, Aluminium, Glass.</p>
			<p>3. Malleability, Creep, Fatigue, tenacity, durability. Testing procedures and importance of each property of materials.</p>		
3	1	1, 2	<p>1. Stress, strain, Hooke's law</p> <p>Types of stresses - Normal stress and Shear stress</p> <p>Types of normal stress - Tensile stress and Compressive stress</p>	<p>1. Plot Stress/strain graph for various structural steel</p>	<p>1.Conduct tensile test on following materials and plot Stress-strain curve a)Mild steel b)HYSD bar</p> <p>Determine yield stress/ proof stress, Ultimate stress, breaking stress and percentage of elongation, Young's Modulus</p>
			<p>2.Types of strains- Normal strain and Shear strain</p> <p>Types of normal strain - Longitudinal strain, Lateral strain and volumetric strain</p> <p>Types of Lateral strain - Tensile strain and Compressive strain</p>		<p>2.Conduct tensile test on following materials and plot Stress-strain curve a) Plastic b) Bamboo c) Fibres</p> <p>Determine yield stress/ proof stress, Ultimate stress, breaking stress and percentage of elongation, Young's Modulus</p>
			<p>3.Problems</p>		



4	1	1, 2	1. Elongation and Contraction - Poisson's Ratio and Modulus of Elasticity.	1. Determine Stresses and Modulus of Elasticity in Civil Engineering Building materials	1. Conduct tensile test and Measure strain using electric strain gauge on following materials and plot Stress-strain curve. a) Mild steel b) HYSD bar  2. Determine yield stress/ proof stress, Ultimate stress, breaking stress and percentage of elongation, Young's Modulus and compare the methods of finding yield stress.
			2. Problems		
			3. Problems		
5	1	1,2	1. Stresses in bars of composite section (Modular ratio).	1. Analyse the thermal stresses in different materials using Open-source Software.	1. Problems on axially loaded composite sections.
			2. Principles of superposition, Deformation of uniform bars and bars of varying cross section subjected to constant load & varying loads.		
			3. Volumetric strain & change in volume, Relation among elastic constants, Thermal stresses.		2. Analysis of Composite Section - Interpretation of Results. (Analysis by ANSYS software)
6	2	1, 2,3	1. Centre of gravity & centroid, Moment of Inertia for Plane lamina: radius of gyration, elastic sectional modulus, parallel and perpendicular axes theorems.	1. Study and compare different geometrical shapes of structural elements like beams, columns, members of truss, shafts etc.	1. Calculation of Centroid and Moment of Inertia of different sections using CADD software.
			2. Moment of Inertia for rectangle, square, circle, semi-circle, and quarter circle and triangle section.		2. Finding the centroid and moment of inertia of irregular sections by manual method (Open ended Experiment) Comparison of M I with manual calculation and CADD software.
			3. M.I of symmetrical and unsymmetrical I section, Channel section.		
7	2	1, 2,3	1. M I of T section, L section, hollow sections, built-up sections about centroidal axes and any other reference axis.	1. Calculation of Moment of Inertia for other built-up sections.	1 & 2. Calculation of centroid and Moment of Inertia by Open-Source application/Ansys for a given section and Influence of MI on a strength of section.
			2. Problems.		

			3.Polar moment of inertia of solid circular sections. - problems.		
8	3	1, 2,3	<p>1. Types of beams –simply supported, cantilever, fixed continuous and overhanging beams.</p> <p>Types of supports: Roller support, Hinged support, Fixed support and Pinned support.</p> <p>2. Determinate structures: Types of loading- Axial load, Transverse load, point load, uniformly distributed load, uniform varying load, moment, support reactions for determinate structures.</p> <p>3. Concept of shear force and bending moment, sign convention. Relation between bending moment, shear force and rate of loading.</p>	1. Differentiate between line, Surface and solid structural elements on the basis of their behaviour under loads.	<p>1.Calculation of Bending Moment and shear force for simply supported beams with UDL and point load.</p> <p>2.Draw Shear force and bending moment diagrams for simply supported beams. (UDL and point load).</p>
9	3	1, 2,3	<p>1. Calculation of Bending Moment and shear force for cantilever beams with UDL and point load and Draw Shear force and bending moment diagrams for cantilever beams with UDL and point load.</p> <p>2. Problems.</p> <p>3. Problems.</p>	<p>1. Calculation of Bending Moment and shear force for for fixed beams with UDL and point load.</p> <p>2.Draw Shear force and bending moment diagrams for fixed beam beams. (UDL and point load).</p>	<p>1. Analyse simply supported beams, subjected to different types of loads, for SFD and BMD using ANSYS software.</p> <p>2. Analyse cantilever beams, subjected to different types of loads, for SFD and BMD using ANSYS software.</p>
10	3	1, 2,3	<p>1. Calculation of Bending Moment and shear force for overhanging beams with UDL and point load Draw Shear force and bending moment diagrams for overhanging beams with UDL and point load and Locate points of contra- flexure.</p> <p>2. Problems.</p>	1.Calculation of bending moment and shear force foe an overhanging beam of bicycle stand.	1& 2. Analyse overhanging beams, subjected to different types of loads, for SFD and BMD using ANSYS software.



			3. Problems		
11	4	1, 2,3	1. Bending stress in beam, Assumptions in simple bending theory, bending equations.	1. Determine bending stress and shear stress across a section of structural elements like RCC beam, Steel beam and purlins.	1. Problems on Bending stress and preparation of bending stress distribution diagram-variation of bending.
			2. Neutral axis, Modulus of rupture, section modulus, flexural rigidity, moment of resistance.		
			3. Bending and Shear Stresses across the cross section of the beams- rectangular and T section.		2. Flexure Test on materials like steel, concrete specimens - Two Point Load system.
12	5	1, 2,3	1. Slope and deflection using Moment area method for simply supported and cantilever beams subjected to symmetrical point loads and UDL.	1.Calculation of deflection for Overhanging beams 2.Limitation of deflection for various structural Elements	1.Calculation and analysis of beams for slope and deflection by Open-Source application / ANSYS software 2.Animations of deflection
			2. Problems		
			3. Problems		
13	5	1, 2,3	1. Introduction – Short and long columns - Euler’s theory	1.Study and prepare a report on the failure modes of Column and Influence of L/D ratio on the Strength of column.	1. Problems
			2. Effective length, slenderness ratio - radius of gyration, buckling load, crippling load		
			3. Assumptions, Euler’s Buckling load for different end conditions, Limitations of Euler’s theory		2. Calculation and analysis of crippling load by Open-Source application/ANSYS software for Axial load, eccentric load and column with different materials
<b>Total in hours</b>			<b>39</b>	<b>13</b>	<b>52</b>

**NOTE 1:** The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits.

**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty.

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

#### 5. Format for CIE written Test

Course Name	<b>Strength of Materials</b>	Test	I/II/III	Sem	III/IV
Course Code	<b>20CE31P</b>	Duration	80 Min	Marks	30

**Note:** Answer any one full question from each section. Each full question carries 10 marks.

Section	Assessment Questions	Cognitive Levels	Course Outcome	Marks
I	1			
	2			
II	3			
	4			
III	5			
	6			

Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.

#### 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2

4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
	Average Marks= (8+6+2+2)/4=4.5						5

**Note:** Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

### 7. Reference:

Sl. No.	Description
1	<b>Ramamurtham. S., "Strength of Materials",</b> 14th Edition, DhanpatRai Publications
2	<b>SS Bhavikatti, Strength of Materials</b>
3	Fundamentals of strength of materials by <b>P N Chandramouli</b> " PHI New delhi
4	Relevant IS Codes

### 8. a. CIE Skill Test 1- Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	One Question on forces and its validation with ANSYS software	10
3	One Experimental Question to Conduct hardness test/tensile test/Impact test for a given specimen.  Writing Observations and Tabular column, Equation with all notation-10  Conduction of Experiment-10  Calculation and result with graph-20	40
4	Manual Calculation of Centroid and Moment of Inertia of given section and validate using CADD	30
5	Viva- voce	10
<b>Total Marks</b>		<b>100</b>

**8. b. CIE Skill Test 2 - Scheme of Evaluation**

<b>SL. No.</b>	<b>Particulars/Dimension</b>	<b>Marks</b>
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Manual Calculation of Shear force and Bending moment - 10 marks  Draw SFD & BMD for Simply supported beam / cantilever beam / overhanging beam with point load and UDL - 10 marks  Validation with ANSYS software- 10 marks	30
3	One Experimental Question on UTM to Conduct a flexural test for a given specimen  Writing Observations and Tabular column, Equation with all notation-10 marks  Conduction of Experiment-10 marks  Calculation and result -10 marks	30
4	One question on column deflection/bending and its validation with ANSYS software	20
5	Viva- voce	10
<b>Total Marks</b>		<b>100</b>

**8. c. SEE Scheme of Evaluation**

<b>SL. No.</b>	<b>Particulars/Dimension</b>	<b>Marks</b>
1	One Experimental Question to Conduct hardness test/tensile test/Impact test/ flexural test for a given specimen.  Writing Observations and Tabular column, Equation with all notation-10 marks  Conduction of Experiment-10 marks  Calculation and result with graph-10 marks	30
2	Manual Calculation of Shear force and Bending moment - 10 marks  Draw SFD & BMD for Simply supported beam / cantilever beam / overhanging beam with point load and UDL - 10 marks  Validation with ANSYS software- 10 marks	30

3	a. One question on column deflection/bending and its validation with ANSYS software - 20 marks  <b>OR</b> b. Manual Calculation of Centroid and Moment of Inertia of given section and validate using CADD - 20 marks	20
4	Viva- voce	20
<b>Total Marks</b>		<b>100</b>

**Note for the External Examiner:** The choice between the questions 3a and 3b shall be done by the external examiner.

### 9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Lami's apparatus	It Consists of a board of about 65 × 50cm, with two aluminium pulleys, on clamp, for mounting on board in any desired position. Complete with three mass hangers and 12 slotted masses, each of 50g each.	20
2	Hardness test apparatus-Rockwell	Model Number: TRSN. Test Loads: 60,100,150 kgs (Rockwell) Initial Loads: 10 (kgs) Maximum Test Height: 222 mm. Depth of Throat: 130 mm. Machine Height: 627 mm. Net weight: Approx. 65 kg. Size of base: Approx. 450 * 265 mm.	5
3	Universal Hardness test apparatus	<ul style="list-style-type: none"> <li>• Screen display of hardness value and scale with 0.1-unit resolution</li> <li>• Built-in x50 total magnification</li> <li>• Variable test sequence timing from 1 to 50 s</li> <li>• Multiple loads available               <ul style="list-style-type: none"> <li>- Vickers: 3, 5, 10, 30 and 100 kgf</li> <li>- Brinell: 5, 10, 30, 62.5 and 187.5 kgf</li> </ul> </li> </ul>	2



		- Rockwell: 10, 60, 100 and 150 kgf	
4	Impact test apparatus-charpy's apparatus	Model 50 Maximum Capacity Units- J 500 Maximum Scale Graduation Units- J 0.1 Overall Size without Protection Guard (Approx.) L x W x H Units- m 1.1 x 0.45 x 1.65 Overall Size with Protection Guard (Approx.) L x W x H Units- m 2.2 x 1.2 x 2.1 Net Weight of Machine (Approx.) Units- kg 500	4
5	UTM	Force range: 10kN, 20kN, 30kN, 50kN, and 100kN. ... Crosshead speed: 0.05 to 500 mm/min. Speed accuracy: < 0.5% Load cell accuracy: $\pm 0.5\%$ of reading. Software: software for tensile, compression + bending incl. Electrical supply: 220-230Vac, 50Hz, 1kVA, single phase 3 wires. Accessories: ... Weight:	1
6	Dial Gauge With magnetic stand	Clamping Force (N): 600 N Overall Height (mm): 220 mm Applicable for: For Dial Test Indicator Size (mm): 10 mm	4
7	Electric Strain gauge.	Gauge Length 0.3mm to 60mm Gauge Resistance Within $\pm 0.3\%$ of the nominal resistance	4
8	Desktop Computers / Laptops	8 GB RAM, 512GB HARD DRIVE, i5 and above 2.5 GHz PROCESSOR,	20
9	Computer Aided Drafting Software- AUTOCAD	LICENSED, Ver. 2020 and above	1 / computer
10	ANSYS	LICENSED, Ver. 2020 and above	1 / computer



**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	Third Semester
<b>Course Code</b>	20CE32P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Modern Surveying	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L: T:P:: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale** Civil engineering is one of the oldest engineering disciplines in the world. In the era of globalization today, technology has brought significant advancements in surveying instruments and technology. Available precise digital surveying instruments are used in the field of civil engineering currently due to their accuracy, speed and easy operation. Since remote sensing, GIS, GPS, photogrammetric survey is a vital discipline and being widely used for plotting and storing spatial information, it is expected the students should know the basics of the same to apply it in the field. Through this course students will develop the desired skills and competencies which are expected from them for survey related works.

**2. Course Outcomes/Skill Sets:** At the end of this course students will be able to:

CO-01	Select and explain the use of the right instrument for surveying a given area, structure and/or topography.
CO-02	Prepare an area map for a specific construction activity by measuring distances, angles, choosing the right bearings, relative position and contours using the appropriate instrument(s).
CO-03	Calculate heights of different structures, relative altitudes and distances of different points on ground using appropriate instruments.
CO-04	Use GPS, remote sensing, advanced instruments and other techniques for surveying of specific areas.

**3. Course Content**

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)
1	01 02 03	1,2, 4,7	1. Contours, Importance of contour maps. Characteristics of contours.	1. Study the contour maps	1. Conduct block contouring for a minimum area of

			<p>2. Methods of plotting contours. Factors affecting contour interval.</p> <p>3. Method of preparing contour map from the given RLs of grid points with examples.</p>	<p>of different topography.</p> <p>2 Study the Uses of Contours in civil engineering field</p> <p>3 Measure the volume of Reservoir from contour maps.</p>	<p>40 m x 40 m to draw its contour plan at a suitable contour interval.</p> <p>2. Find out the area enclosed by the contours using AutoCAD.</p>
2	1	1,2,4,7	<p>1. Component parts of transit theodolite and their functions.</p> <p>2. Reading the vernier, Salient features and relationship between the fundamental axes of transit theodolite.</p> <p>3. Technical terms used. Temporary adjustments.</p>	<p>1. List the Applications of different types of theodolites.</p>	<p>1. Measure horizontal angle between the given points.</p> <p>2. Measure vertical angle between the given points.</p>
3	1	1,2,4,7	<p>1. Theodolite traversing. Open and Closed Traverse.</p> <p>2. Theodolite traversing by included angle method and deflection angle method.</p> <p>3. Checks for open and closed traverse, Calculation of bearing from angles. Traverse computation-Latitude, Departure.</p>	<p>1. Study the Consecutive coordinates, independent coordinates.</p> <p>2. Balance the traverse using spreadsheet by Bowditch rule or Transit rule.</p> <p>3. Conduct Contouring using Theodolite.</p>	<p>1. Measure horizontal angle by repetition and reiteration method.</p> <p>2. Carry out survey project for closed traverse for minimum 5 sides by locating details using theodolite.</p>
4	2	1,2,4,7	<p>1. Trigonometrical Survey and its applications.</p> <p>2. Elevations and Distances of accessible points whose base is accessible-Single plane method-Simple problems.</p> <p>3. Elevations and Distances of inaccessible points whose base is inaccessible-Single plane method-Simple problems.</p>	<p>1. How do we measure heights of mountains?</p> <p>2. Measure height of inaccessible high-rise towers.</p>	<p>1. Measure height of an object whose base is accessible.</p> <p>2. Measure height of an object whose base is inaccessible.</p>

5	2	1,2,4,7	<p>1. Tachometer: Principle of tachometry and component parts. Analytic lens</p> <p>2. Tachometric formula for horizontal distance with telescope horizontal and staff vertical.</p> <p>3. Method of determining Horizontal and vertical distances with tachometer by fixed hair method and staff held vertical.</p>	<p>1. List the applications of Tachometric survey.</p> <p>2. List the limitations of tachometry.</p>	<p>1. Determine Tachometric constants.</p> <p>2. Calculate the reduced levels and horizontal distances of given points using tachometer.</p>
6	3	1,2,4,7	<p>1. Total Station: Introduction, Integral parts, Applications.</p> <p>2. Working principle, Advantages, Disadvantages.</p> <p>3. Use of function keys. Precautions to be taken while using a Total Station.</p>	<p>1. List the Applications of different types of Total Stations.</p> <p>2. Differentiate between theodolite and Total station.</p>	<p>1. Component parts and General commands used.</p> <p>2. Instrument preparation and setting up.</p>
7	3	1,2,4,7	<p>1. Setting up a back sight. Azimuth mark, control point. Change point - procedure to shift change point and precautions to be taken. General settings.</p> <p>2. Automatic Target Recognition, Field Book recording, Radial Shoot.</p> <p>3. Survey Station Description (codes). Occupied point (Instrument Station) Entries.</p>	<p>1. Calculate Height using Trigonometric survey and compare results with total station.</p>	<p>1. Find out the Horizontal angle, Vertical angle of given points.</p> <p>2. Find out the distance, gradient and difference in height between two inaccessible points using Total Station.</p>
8	3	1,2,4,7	<p>1. 3D coordinates: By Resection. Coordinate calculation. Offset: Single distance offset.</p> <p>2. Data Retrieval, Field Generated Graphics. Data Gathering Components, Data Processing Components of the system.</p> <p>3. Data plotting, Field computers, Modem for data transfer.</p>	<p>1. Compare and prepare report on accuracy of results between Theodolite and Total Station.</p>	<p>1. Stake out using Total Station- Find a specific point and its coordinates in the field.</p> <p>2. Find out the height of a remote point like tip of a transmission tower or chimney using Total Station.</p>
9	3	1,2,4,7	<p>1. Interfacing the Data Collector with a Computer, Digital Data.</p>	<p>1. Compare and prepare a report on time requirements</p>	<p>1&amp; 2: Prepare a topographic sketch of a given area using Total station and plot the</p>

			<p>2. Digital transfer of data to Application software. Requirements of a data collector.</p> <p>3. Calibrating the Instrument Equipment maintenance, Maintaining battery power.</p>	<p>to complete a particular activity by Total Station with other equipment.</p>	<p>contour plan using AutoCAD / Civil 3D/ Auto plotter.</p>
10	3	1,2, 4,7	<p>1. Total station survey system error sources and how to avoid them.</p> <p>2&amp; 3. Controlling errors.</p>	<p>1. How Data is transferred from Total Station to other electronic devices.</p> <p>2. Collect the survey sketch of any place and mark the boundaries and determine the area using total station</p>	<p>1. Conduct a closed traverse for a given area using Total Station. (Including minimum two change points)</p> <p>2. Plot the area map of the closed traverse conducted using AutoCAD and Find the area.</p>
11	4	1,2, 4,7	<p>Construction Layout Using Total Station</p> <p>1. How to set control points around the layout site.</p> <p>2. How control points and coordinates are used to set out the position of buildings (how the positions of the actual structures are fixed and site profiles to guide the excavation and pouring concrete into the foundations)</p> <p>3. Setting up site profiles and sight rails for Drainage.</p>	<p>List the points that should be kept in mind while using Total station during the operation of</p> <p>a. Levelling b. Measuring distances c. Measuring angles. d. Contouring</p>	<p>1. Set out control points for centre line marking of a building using the total station.</p> <p>2. Set out control points for laying of pipeline using total station.</p>
12	4	1,2, 4,7	<p>1. Aerial Surveying, GPS: Introduction, Applications. Positioning methods, Errors and Limitations in GPS. applications of Google maps in civil Engineering.</p> <p>2. Remote Sensing: Introduction, Basic components of remote sensing, energy interaction with the earth surfaces.</p>	<p>1. How the Remote sensing Interpretation is done?</p> <p>2. Study the classification, applications, advantages &amp; Disadvantages</p>	<p>Virtual Media and Field Visit</p>



			3. Applications of remote sensing in mining, land use/land cover, mapping, disaster management and environment.	of GPS surveying 3. Prepare a Technical Report on Field Visit.	
13	4	1,2,4,7	1. GIS: Overview, components Applications and Limitations. 2. Drone Surveying: Overview, Applications and Limitations. 3. Lidar: Overview, Applications and Advantages. Hyper spectral Imagery.	1. What is the need of GIS for civil engineers? 2. Prepare a Technical Report on Field Visit.	Virtual Media and Field Visit
<b>Total in hours</b>			<b>39</b>	<b>13</b>	<b>52</b>

**NOTE 1:** The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits.

**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty.

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

#### 5. Format for CIE written Test

Course Name	<b>Surveying</b>	Test	I/II/III	Sem	III/IV
Course Code	<b>20CE32P</b>	Duration	80 Min	Marks	30
<b>Note:</b> Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions		Cognitive Levels	Course Outcome	Marks

I	1			
	2			
II	3			
	4			
III	5			
	6			

Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.

### 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
Average Marks= (8+6+2+2)/4=4.5							<b>5</b>

**Note:** Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

### 7. Reference:

Sl. No.	Description
1	<b>Duggal, S. K., Surveying Vol. I &amp; II</b> , Tata Mcgraw Hill, New Delhi
2	<b>Subramanian, R., Surveying &amp; Levelling</b> , Oxford University Press, New Delhi
3	<b>Punamia, B.C., Surveying Vol. I, II &amp; III</b> , Laxmi Publications
4	<b>Kanetkar, T.P. and Kulkarni, S.V., Surveying and Levelling Vol. I &amp; II</b> , Pune Vidyarthi Gruh
5	<b>Arora, K.R., Surveying Vol. I, II &amp; III</b> , Standard Book House. New Delhi
6	<b>Basak, N.N., Surveying and Levelling</b> , Tata Mcgraw Hill, New Delhi
7	<b>A. Bannister, S. Raymond, R. Baker, "Surveying"</b> , Pearson, 7th ed., NewDelhi
8	<b>Agor, R., Surveying and Levelling</b> , Khanna Publishers, New Delhi
9	<b>Agor, R. Advanced Surveying</b> , Khanna Publishers, New Delhi

10	<b>Roy, S.K., Fundamentals of Surveying</b> , Prentice Hall India, New Delhi
11	<b>Remote Sensing and GIS by B Bhatia</b> , Oxford University Press, New Delhi.
12	<b>Remote sensing and Image interpretation by T.M Lillesand, R.W Kiefer and J.W Chipman</b> , 5th edition, John Wiley and Sons India
13	<b>Lo, C.P. &amp; Yeung A.K.W., Concepts and Techniques of Geographic Information Systems</b> , Prentice Hall of India, New Delhi, 2002
14	<b>Anji Reddy, M., Remote Sensing and Geographical Information Systems</b> , B.S.Publications, Hyderabad, 2001

### 8. a. CIE Skill Test 1- Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	<p>Experiment on theodolite</p> <p>a. Measurement of horizontal angle (Repetition or Reiteration method)/ measurement of Vertical angle using theodolite.</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Carry out closed traverse for minimum 5 sides including locating details using theodolite.</p> <p>(i) Writing Field Procedure, formula and tabular column -10 marks</p> <p>(ii) Setting and conduction - 20 marks</p> <p>(iii) Observations, Recordings and calculations-15 marks</p> <p>(iv) Interpretation of result and Plotting- 05 marks</p>	50
3	<p>a. Measure height of an object whose base is accessible / inaccessible by Trigonometrical survey.</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Determine Tachometric constants / Calculate the reduced levels and horizontal distances of given points by tachometric survey</p> <p>(i) Writing Field Procedure, formula and tabular column -05 marks</p> <p>(ii) Setting and conduction - 10 marks</p> <p>(iii) Observations, Recordings and calculations-10 marks</p>	30

	(iv) Interpretation of result and Plotting- 05 marks	
4	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

**Note for the Examiner:**

1. The choice between the questions 2a and 2b shall be done by the examiner.
2. The choice between the questions 3a and 3b shall be done by the examiner.

**8. b. CIE Skill Test 2 - Scheme of evaluation**

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	<p>Experiment on total station.</p> <p>a. Find out the Horizontal angle/ Vertical angle/ distance/gradient/difference in height of given points using total station.</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Find a specific point and its coordinates in the field/ height of a remote point using Total Station.</p> <p>(i) Writing Field Procedure, formula and tabular column -10 marks</p> <p>(ii) Setting and operation - 10 marks</p> <p>(iii) Observations, Recordings and calculations-10 marks</p> <p>(iv) Interpretation of result and Plotting- 10 marks</p>	40
3	<p>Experiment on total station.</p> <p>a. Prepare a contour plan of a given area using Total station and plot it using CADD.</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Form a closed traverse using Total Station, Plot the area map using CADD and find the area of closed traverse</p> <p>(i) Writing Field Procedure, formula and tabular column -10 marks</p> <p>(ii) Setting and operation - 10 marks</p> <p>(iii) Observations, Recordings and calculations-10 marks</p>	40

	(iv) Interpretation of result and Plotting- 10 marks	
4	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

**Note for the Examiner:**

1. The choice between the questions 2a and 2b shall be done by the examiner.
2. The choice between the questions 3a and 3b shall be done by the examiner.

**8. c. SEE Scheme of Evaluation**

SL. No.	Particulars/Dimension	Marks
1	a. Experiment on theodolite (i) Writing Field Procedure, formula and tabular column -10 marks (ii) Setting and conduction - 15 marks (iii) Observations, Recordings and calculations-10 marks (iv) Interpretation of result and Plotting- 05 marks	40
2	Experiment on total station (i) Writing Field Procedure, formula and tabular column -10 marks (ii) Setting and operation - 15 marks (iii) Observations, Recordings and calculations-10 marks (iv) Interpretation of result and Plotting- 05 marks	40
3	Viva-Voce	20
<b>Total Marks</b>		<b>100</b>

**9. Equipment/software list with Specification for a batch of 20 students**

Sl. No.	Particulars	Specification	Quantity
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1	Dumpy Level with accessories	Length of Telescope: 300mm. Length: 215mm Short Distance:1.5m Objective aperture: 32mm	4
2	Auto Level with accessories	Accuracy (MM): 1/16 in. per km Double-run (2.0 mm), Magnification: Choice of 24x, 28x, 32x, Operating Temperature Range: -4 to +122 Deg F (-20 to +50 Deg C), Diameter of Objective: 1.26 in. (32 mm), Field of View: 2.5 ft. at 100 ft. (1 Deg 25 Feet)	4
3	Telescopic Levelling staff 5M	Material: Aluminium. Measuring Range: 1M/Unit. Resolution: 2cm	4
4	Ranging rod 2m	Circular / Octagonal Ranging Rods preferably circular with 3 to 5 cm diameter made up of either seasoned solid bamboo stick or metal conduit pipe of length 2 to 3 meters, with conical metallic shoe fitted at bottom & fully painted with 20 cm. long colour bands of either of the following combinations.  Salient Features: a) Black & White - size 2 meters. b) Red & White - size 3 meters	5
5	Arrows	Material: Steel Ringed. Top:35 mm Colour: Red & White	6
6	Engineers Chain	Chain-30 Mtr or 100 Feet in 100 Links in Metal Tags & Rings & Brass Handle Material: MS Wire & Brass	4
7	Measuring Tape 15m	Tapes Type Fibreglass Measurement Tape Colour Grey	4
8	Prism and prism pole	Colour: Red, Material: Aluminium, Accuracy:< 5 Second, Offset:0/-30mm, Thickness:64 mm	2

9	Total Station	Magnification 24x, Field of View 1-30-inch, Minimum Focusing Distance 1.5 Meter, Singles Prism Distance Measurement 4.0 Km, Accuracy 3mm +2ppm	2
10	Prismatic compass with stand	Aluminium Prismatic Compass, Packaging Type: Carton Box, Size/Diameter: 4 Inch, Weight 539 grams	4
11	Twenty Second Transit Theodolite with accessories.	Angle Measurement Accuracy 20 secs, Display Panel Single Side, Magnification 30x, Measuring Time 30 Sec, Field of View 2.6 m at 100 meters	4
12	Electronic Digital Theodolite with accessories.	Digital Theodolite - Geomax ZIPP 02, For Survey, (hz, V), Model Name/Number ZIPP 02, Brand Geo max zipp 02, Angle Measurement Accuracy (Hz, V), Colour yellow, Battery Operation charger	4
13	Handheld GPS navigator	Screen Size 3.5 Inch, Type Wireless, Usage Land Survey, Width 69 mm, Depth 30 mm	4
14	Wooden Pegs	Finish Rustic, Colour Brown, Length 2-5 Feet	6
15	Computers	Dell Optiplex 19 inch, All in One Desktop Set: Intel i5 3470, 8GB, 500GB HDD, 19 inches HD Monitor, Keyboard, Mouse, HD Webcam, Mic, Speakers, Wi-Fi, Display Port, Windows 10 Pro, MS Office	10
16	CADD software	AutoCAD LT	1



**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	Third Semester
<b>Course Code</b>	20CE33P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Construction Techniques	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L:T:P :: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale:** Civil engineering is the oldest discipline of engineering. Since the very beginning of human existence, it has been an aspect of life. Construction is an important sector of civil engineering that contributes greatly in the economic growth of a nation. Civil engineers design, construct, supervise, operate, and maintain large construction projects and systems. It is expected that the students should know the basics of the same to apply it in the field. Through this course students will develop the desired skills and competencies which are expected from them for construction related works.

**2. Course Outcomes/Skill Sets:** At the end of this course students will be able to

CO-01	Select the type of building suitable for construction for a given climatic conditions and justify the reasons for such a selection.
CO-02	Identify the type of soil, test it to confirm properties and strength, recommend suitable excavation methods and type of foundations.
CO-03	Select a suitable type of superstructure, list the various components to be built and recommend the appropriate construction techniques and services to be used for a required building structure.
CO-04	Identify the reasons for deterioration of a given structure using the appropriate diagnostic methods and tools, record the levels of distress and recommend corrective action plans for repair and rehabilitation of that structure.

**3. Course Content**

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)
1	1	1,2,4	1. Climatic factors: Tropical climate, solar & wind flow pattern, Time lag & decrement factor, Periodic heat flow.	1. Study the Standard Penetration test	1. Field Identification of type of soil based

			<p>2. Classification of soils and their suitability for the construction of different structures. Bearing capacity of soil, Safe bearing capacity of soil.</p> <p>3. Determination of Bearing capacity by Standard penetration test (SPT), Method of improving the safe bearing capacity</p>	<p>and Plate load test.</p> <p>2. Study and prepare a report on local rainfall data and type of soil strata available.</p>	<p>on visualization and validate the type of soil by conducting sieve analysis test - Particle size distribution using semi-log graph.</p> <p>2. Test on soil: a) Liquid limit b) Plastic limit c) Shrinkage limit.</p>
2	2	2,4,7	<p>1. Site clearance, Process of general &amp; deep excavation, Necessity of shoring, Soil nailing and strutting in foundation, excavation and process of dewatering, purpose of anti-termite treatment, type of chemical used &amp; laying method.</p> <p>2. Foundation: Purpose and classification of foundation. Shallow foundation: Isolated footing Spread footing, combined footing, Strap footing and Raft foundation.</p> <p>3. Deep foundation: Pile foundation and its types and Caisson foundation. Selection of foundation for different types of structures.</p>	<p>1. List the tools and equipments used for site clearance and excavation work</p> <p>2. Study and prepare a report on advanced techniques in laying foundation.</p>	<p>1 Tests on Moisture content of soil (Oven drying method and Field density of soil by core cutter and rapid moisture meter.</p> <p>2. Conduct Standard Proctor test on soil compaction.</p>
3	2	1,2,4,7	<p>1. Foundation in Black Cotton Soil. Causes for failure of foundation and preventive measures.</p> <p>2. Plinth beam or Plinth slab / grade beams. Superstructure-Column, Beams and their suitability for different structures.</p> <p>3. Load bearing walls, non-load bearing walls &amp; framed structure. Main attributes of masonry work, Technique used in masonry work.</p>	<p>1. Study the construction methodology of basement and Retaining wall.</p> <p>2. Study &amp; prepare a report on Advanced techniques in masonry work.</p>	<p>1. Free swell Index of Black cotton soil.</p> <p>2. Water Absorption test &amp; other field test on brick.</p> <p>3. Compression test on bricks, Dimensionality tolerance test.</p>
4	3	2,4,7	<p>1 &amp; 2. Types of masonry work and their suitability. Stone masonry, Brick masonry, Concrete Block masonry and their types.</p>	<p>1. Study &amp; prepare a report on various Precast concrete partition walls.</p> <p>2. Prepare a report on Autoclave</p>	<p>1. Construction of English bond &amp; Flemish bond, also prepare a masonry checklist for</p>



			3. Partition walls and its types based on materials. Dry wall construction Structural Glazing, Aluminium Panelling, Infill walls and Envelopes.	brick masonry, Stabilized mud block masonry, Poro Thermo Block masonry. Laterite brick masonry.	before & after construction.  2. Construct concrete block masonry wall of height 1metre.
5	3	1,2,3 ,7	1. Ventilation requirements for health mechanisms, natural ventilation, cross ventilation and artificial ventilation, Airflow patterns in building. Purpose of providing doors, windows and ventilators and its suitability.  2.Lintels, sunshades, sun breakers and canopy, portico and their suitability.  3.Arch-Terms used, Types of arches-Flat, Segmental, and Semi-circular and their suitability.	1. Study & present the Standard size of doors, windows & ventilators for different types of building as per I.S codes.	1.Study and present important types of doors, windows and ventilators in general use.  2. Prepare process manual for installation of doors, windows and ventilators.
6	3	1,2,3 ,7	1. Stairs: Technical terms, Requirements of a stair, Indian Standards for dimensions of stairs, Construction method of staircase and its headroom.  2.Elevators: Lift pit - Foundation for Lift and concrete or Block work with intermediate column beam structure around the lift and lift headroom  3.Ramps and escalators and their importance as per Indian Standards	1. Study the Suitability of staircases, ramps, elevators and escalators in different typologies of buildings	1. Study & present different types of stairs  2.Prepare process manuals for construction of staircases, ramps and lift pit.
7	3	1,3	1.Introduction to Formwork, shuttering, centring, staging, scaffolding and its applications.  2. Scaffolding: Component parts, types of scaffolding and props, Materials used for scaffoldings.  3. Types of shoring-Raking, Flying & Dead shores. Safety precautions while using scaffolding.	1. Visit the construction site and collect details of the advanced types of scaffoldings and prepare a report.	1.Prepare a checklist (before, during after the work) & process manual for different types of scaffolding.  2. Draw different types of scaffolding using BIM software (3D using

					AutoCAD, Revit, Sketch etc.)
8	3	2,3,7	<p>1. Formwork: Purpose of providing formwork. Types of formworks based on material.</p> <p>2. Requirements and Codal provisions for Standard formwork. Monolithic Construction Formwork.</p> <p>3. Method of shuttering and centring &amp; removal of formwork. Formwork Failures and Remedies.</p>	<p>1. Visit construction site and prepare a photo gallery of different formworks adopted for various construction activities.</p>	<p>1. Study and present the tools and components used for formwork.</p> <p>2. Prepare a checklist &amp; process manual for different types of form work.</p>
9	3	1,2,5,7	<p>1. Roof: Types of roofs, common types of Roofing materials.</p> <p>2. Pitched roof, its basic components and its suitability. Flat roof-advantages and disadvantages</p> <p>3. Weather proof course for flat roofs. False ceiling and its suitability.</p>	<p>1. Study &amp; compare different types of roofs considering typology of building and atmospheric conditions.</p>	<p>1. Prepare a checklist &amp; process manual for construction of different types of roofs &amp; trusses.</p> <p>2. Study and present the technique of laying different types of roofs &amp; trusses.</p>
10	3	1,2,4,7	<p>1. Objectives of plastering and requirements of good plaster. Method of cement plastering,</p> <p>2. Types of plaster and surface finishes- Smooth, sand faced, rough cast, pebble dash, debtor, scrapped, textured finish.</p> <p>3. Pointing- Method of pointing &amp; types. Fixing of doors and windows using different fixtures.</p>	<p>1. Study &amp; present advanced plastering and surface finishing techniques and its suitability.</p>	<p>1. Visit a construction site during Plastering Activity-Prepare check list &amp; process manual for cement plastering.</p>

					2. Prepare checklist & process manual for Gypsum/ POP plastering.
11	3	1,2,5,7	<p>1. Definition and causes of dampness. Effects of dampness and prevention of dampness. Materials used for the damp proof course.</p> <p>2. Method of Terrace waterproofing, Water tank waterproofing Methods &amp; types of expansion joint treatment. Roof slab leakages or dampness and arresting it.</p> <p>3. Waterproofing technique for swimming pools, sump, podium, bathroom sunken slabs, water closets, retaining wall.</p>	<p>1. Study on advanced waterproofing techniques and grouting techniques.</p> <p>2. Study and Collect working procedure for pressure grouting application for roof slab leakage or dampness</p>	<p>1. Prepare checklist &amp; process manual for Waterproofing and laying procedure for different areas of building.</p> <p>2. Types &amp; laying procedure of grouts.</p>
12	3	1,2,5,7	<p>1. Types of floors, Suitability of flooring material, Process of laying Cement concrete floorings.</p> <p>2. Process of laying Oxide flooring. Ceramic tile flooring, Vitrified flooring, granite flooring, Marble flooring.</p> <p>3. Wooden flooring, Vinyl flooring, Vacuum dewatered flooring, IPF flooring, epoxy flooring, False flooring. Cladding Work and its types, Importance and suitability of cladding work</p>	<p>1. Collect samples and prepare a report on the grouting process for flooring works.</p> <p>2. Study on advanced techniques in flooring.</p> <p>3. Collect &amp; present different types of flooring materials.</p>	<p>1. Prepare checklist &amp; process manual for different types of flooring.</p> <p>2. Prepare checklist &amp; process manual for different types of cladding work.</p>
13	4	2,3,5,7	<p>1. Methods of painting, Types of paints distemping &amp; varnishing on different surfaces. VOC paints &amp; its importance.</p> <p>2. Introduction, Cause of deterioration of concrete structures, Diagnostic methods &amp; analysis, preliminary investigations, experimental investigations using NDT.</p> <p>3. Techniques for Repair: (Corrosion) Rust eliminators and polymer coating for rebar during repair, foamed concrete,</p>	<p>1. Study &amp; present advanced technique in painting.</p> <p>2. Prepare a report on method of application of external texture painting works.</p>	<p>1. Visit a construction site during Painting activity, Prepare check list &amp; process manual for painting on different surfaces (Any one method)</p>



			mortar and dry pack, vacuum concrete, Guniting and Shotcrete, Epoxy injection, Mortar repair for cracks, shoring and underpinning.		2. Site visit, investigate the problem using NDT, analyse, adopt suitable method of repair & prepare check list & process manual for repair work.
<b>Total in hours</b>			<b>39</b>	<b>13</b>	<b>52</b>

**NOTE 1:** The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits.

**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty.

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

#### 5. Format for CIE written Test

Course Name	<b>Construction Techniques</b>	Test	I/II/III	Sem	III/IV
Course Code	<b>20CE33P</b>	Duration	80 Min	Marks	30
<b>Note:</b> Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions	Cognitive Levels	Course Outcome	Marks	
I	1				

	2			
II	3			
	4			
III	5			
	6			

Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.

### 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
Average Marks= (8+6+2+2)/4=4.5							<b>5</b>

**Note:** Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

### 7. Reference:

Sl. No.	Description
1	Koenigsberger, O.H. et al, " <b>Manual of Tropical Housing and Building Part-I Climatic Design</b> ", Orient Longman. 1973
2	Hvorslev MJ, " <b>Subsurface Exploration and Sampling of Soils for Civil Engg. Purposes</b> " Elsevier Pub. Co,
3	Manfredd RH, " <b>Engineering Principles of Ground Modification</b> ", McGraw Hill
4	Purushotham Raj, " <b>Ground Improvement Techniques</b> ".
5	Bureau of Indian Standards, " <b>HandBook of Functional Requirements of Buildings, (Sp-41 &amp;Sp- 32)</b> ", BIS 1987 and 1989.
6	B C Punmia, " <b>Building Construction</b> ", Laxmi Publications
7	<a href="http://www.nptel.ac.in">www.nptel.ac.in</a>

**8. a. CIE Skill Test1 Scheme of Evaluation**

<b>SL. No.</b>	<b>Particulars/Dimension</b>	<b>Marks</b>
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	<p>Test on soil.</p> <p>a. Field identification of soil- 05 marks.</p> <p>b. Conduct sieve analysis test and determine type of soil by Particle size distribution using semi-log graph / Determination of Atterberg Limits a) Liquid limit / b) Plastic limit / c) Shrinkage limit/Field density of soil by core cutter / Standard Proctor Compaction Test on soil.</p> <p>i. Procedure with tabular columns - 10 marks  ii. Conduction of experiment - 15 marks  iii. Result and Conclusion - 05 marks</p>	35
3	<p>Test on Bricks.</p> <p>a. Field test on Bricks (Any 5 test)- 05 marks.</p> <p>b. Compression test on bricks and Dimensionality tolerance test / Free swell Index of Black cotton soil / Construction of English bond masonry /Flemish bond masonry/Construct block masonry wall using suitable infills</p> <p>i. Procedure with tabular columns and check lists if any - 10 marks  ii. Conduction of experiment - 15 marks  iii. Result and Conclusion - 05 marks</p>	35
4	<p>Prepare process manual for.</p> <p>Doors/ Windows / Ventilators/ Staircases / Ramps / Lift pit</p>	10
5	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

**8. b. CIE Skill Test 2 Scheme of Evaluation**

<b>SL. No.</b>	<b>Particulars/Dimension</b>	<b>Marks</b>
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1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Scaffolding: Prepare a checklist (before, during and after) Prepare process manual for form work.  Draw 3D elevation of scaffolding using BIM software like AutoCAD / Revit / Sketch up/ 3D max	20
3	Formwork: Prepare a checklist (before, during and after) Prepare process manual for form work.	10
4	a. Roof construction: Prepare a checklist (before, during and after) Prepare process manual for roof construction. <b>OR</b> b. Truss Installation: Prepare a checklist (before, during and after) Prepare process manual for Truss Installation.	10
5	a. Cement plastering: Prepare a checklist (before, during and after) Prepare process manual for Cement plastering. <b>OR</b> b. Gypsum/ POP plastering: Prepare a checklist (before, during and after) Prepare process manual for Gypsum/ POP plastering.	10
6	Waterproofing and joint filler: Prepare a checklist (before, during and after) Prepare process manual for Waterproofing and joint filler work (grouting).	10
7	Flooring: Prepare a checklist (before, during and after) Prepare process manual for Floor construction.	10
8	Wall cladding: Prepare a checklist (before, during and after) Prepare process manual for Wall cladding.	10
9	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

**Note for the Examiner:**

1. The choice between the questions 4a and 4b shall be done by the examiner.
2. The choice between the questions 5a and 5b shall be done by the examiner.

**8. c. SEE Scheme of Evaluation**

SL. No.	Particulars/Dimension	Marks
	a. Conduct sieve analysis test and determine type of soil by Particle size distribution using semi-log graph / Determination of Atterberg Limits a) Liquid limit / b) Plastic limit / c) Shrinkage limit/Field density of soil by core cutter / Standard Proctor Compaction Test on soil. i. Procedure with tabular columns - 10 marks	

1	<p>ii. Conduction of experiment - 15 marks iii. Result and Conclusion - 10 marks</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Compression test on bricks and Dimensionality tolerance test / Free swell Index of Black cotton soil / Construction of English bond masonry /Flemish bond masonry/Construct block masonry wall using suitable infills</p> <p>i. Procedure with tabular columns and check lists if any - 10 marks ii. Conduction of experiment - 15 marks iii. Result and Conclusion - 10 marks</p>	35
2	<p>a. Draw 3D elevation of scaffolding using BIM software like AutoCAD / Revit / Sketch up/ 3D max. Prepare a checklist (before, after and during) and process manual for repair work.</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Investigate the problem using NDT, analyse and adopt a suitable method of repair. Prepare a checklist &amp; process manual for repair work.</p>	25
3	<p>Prepare <b>process manual</b> and <b>checklists</b> for any <b>TWO</b> of the following construction activities.</p> <p>a. Earthwork Excavation b. Foundation / Footing and column c. SSM d. BBM e. Formwork f. Roof construction g. Truss Installation h. Cement plastering i. Gypsum/ POP plastering j. Waterproofing and joint filler k. Flooring l. Wall cladding</p>	20
4	Viva-Voce	20
<b>Total Marks</b>		<b>100</b>

**Note for the External Examiner:**

1. The choice between the questions 1a and 1b shall be done by the external examiner.
2. The choice between the questions 2a and 2b shall be done by the external examiner.

**9. Equipment/software list with Specification for a batch of 20 students**

Sl. No.	Particulars	Specification	Quantity

1.	IS Sieve 20 mm , 10 mm 4.75 mm , 2.00 mm , 1.18 mm , 600 μm, 425 μm , 300 μm, 212 mm , 150 μm , 75 μm , Pan	IS sieve for soil testing	1 set
2.	Measuring Jars of 1000, 500, 100, 10ml	Plastic measuring JAR	1set
3	Digital weighing Balance 12 kg capacity with minimum 1 gm. accuracy	0.5gm accuracy	1no
4	Hot air Oven	Stainless Steel Member Lab Oven	1no
5	Core cutter with dolly	Soil Testing Machine	1set
6	Standard proctor compaction apparatus	Cylindrical Metal Mold, having internal diameter 4" or 6", the internal height of 4.6" and the mold should have detachable base plate & collar of 2 inches (5.08 cm), Rammer, weighing 5.5 lbs (2.5 kg) & having fall of 12 inches (30.5 cm), with a flat circular face of 2" diameter.	1set
7	Atterberg limits apparatus	Soil testing apparatus	1set
8	Ultrasonic pulse velocity kit	oscillation frequency in range of 40 kHz to 50 kHz	1set
9	Rebound Hammer	Measuring range from 10 to 130 N/mm <sup>2</sup>	1no
10	Non-Destructive Half-Cell Potentiometer Testing on Concrete	As per ASTM C 876-91.	1set
11	Portable core drilling machine	350mm core cutting machine	1set
12	A complete assembly of point load tests.	capacity of the loading machine is usually 25kN or 50kN and typically utilizes a hydraulic pressure gauge	1set

13	AutoCAD	Ver. 2020 and above	1license/college
14	Sketch up/3Ds Max/Revit	Ver. 2018 and above	1license/college
15	Pick Axe	For digging soil	4nos
16	Spirit level	1mtr length	2nos
17	Trowel	Big	3nos
18	Trowel	Medium	3nos
19	Trowel	Small	3nos
20	Oil can	250ml (for pouring water)	5nos
21	Right angle 1*1.5m	1*1.5m	1no
22	Measuring tape	metal tape 3mtr	5nos
23	Safety goggle	Engineer's safety goggle	4nos
24	Wheelbarrow	Small	1no
25	Portable Air blower	Hand blower type power 600w	1no





**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	III
<b>Course Code</b>	20CE34P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Building Drawing using CADD	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L:T:P :: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale:** Drawing is the language of Civil Engineers. Drawing is fundamentally the pictorial and written form of representation of any construction including every bit of detail such as wall colour, furniture, floor space, material details, outlets, lighting, equipment etc. Drawings are important because they are used to communicate the technical details of a project in a common format. It is used as a final drawing on the basis of which engineers proceed to further development. It is expected the students should know the basics of the same to apply it in the field. Through this course students will develop the desired skills and competencies which are expected from them for drawing related works.

**2. Course Outcomes/Skill Sets:** At the end of the semester student will be able to:

CO-01	Prepare a site plan by using concepts of building planning, climatic parameters and building bye laws applicable to that type of building for a given location.
CO-02	Prepare a single line diagram, building drawing including plan, elevation and section for a given type of building for a given location.
CO-03	Prepare plumbing drawing using standard symbols and legends along with recommending the location, type of pipe material, fittings and fixtures for a given building.
CO-04	Prepare electrical drawing and fire fighting layout appropriate for a given building.

**1. Course Content**

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)

1	1	1,4,5,7	<p>1. Building Bye Laws: Introduction, objects, Importance and Important terms used in building bye laws</p> <p>2. Function of Local Authority, Responsibility of owner, Applicability and Principles underlying building bye laws, Setbacks or building line, light plane, Floor Space Index</p> <p>3. Building bye laws to be practiced: Off street Parking, Fire Protection, Minimum Plot sizes, Thickness of walls, Plinth, Cellar, Height of floors, Stairs, Lifts, Lobbies and Corridors, Sanitary accommodation</p>	<p>1. Study and compare the building bye laws for different typologies of buildings and location of building</p>	<p>1. Symbols and sign conventions used in building drawings as per IS standards</p> <p>2. Introduction to basic BIM softwares like AutoCAD, ARCHICAD, REVIT ARCHITECTURE, 3DSMAX, SKETCHUP</p>
2	1	1,4,5,7	<p>1. Building bye laws to be practiced: Fenestration, Ventilation, Sills of openings, Staircases, Ramps, Roofs, Parapets and Terraces, Water tank, Refuse area/ Disposal of Solid waste, Discharge of Rainwater, Provision of Letter box.</p> <p>2. Margin and Maximum Built up area, Plinth areas, for different types of buildings, Permissible Built-up area in margins, Projections in margins, Margins from Common plot, Open spaces, floor area ratio, carpet area key plan (layout plan), Site plan, building plan, working plan.</p> <p>3. Building Planning- Factors, Shape, size and topography of site, Climatic conditions of the site, Safety precautions to be followed at site during building construction as per National Building Code (NBC).</p>	<p>1. Practice drawing of Site plan with setbacks and orientations for different dimensions.</p> <p>2. Study the elements of Sustainable Planning as per NBC 2016.</p>	<p>1. Drawing of site plan showing setbacks for residential building using CADD software.</p> <p>2. Mark the site plan on the field giving setbacks.</p>
3	2	1,4,7	<p>Given the floor area or carpet areas of rooms, plan the building and draw a Single line diagram of the building.</p> <p>1. Residential building 2. Commercial Buildings 3. Industrial Building.</p>	<p>1. Prepare Manual Drawing of Single line diagrams for different typology of buildings. Considering building bye laws</p>	<p>1. Execute the single line diagram using CADD software.</p> <p>2. Mark the single line diagram and foundation layout for load bearing and Framed structures on the field using centre line marking method.</p>
4	2	1,4,7	<p>1. Given the floor area or carpet areas of rooms, plan the building and draw a Single line diagram of the building.</p> <p>1. Residential building 2. Commercial Buildings 3. Industrial Building</p>	<p>1. Prepare Manual Drawing of Single line diagrams for different typology of buildings</p>	<p>1. Execute the single line diagram using CADD software.</p> <p>2. Mark the single line diagram and footing layout for load bearing and Framed structures</p>

				considering building bye laws.	on the field using centre line marking method.
5	2	1,4,7	<p>Draw the following views for Residential buildings</p> <ol style="list-style-type: none"> <li>1. Plan</li> <li>2. Elevation</li> <li>3. Section</li> </ol>	<p>1.Create 3-D model of residential buildings using software's like ARCHICAD, REVIT ARCHITECTURE, SKETCH UP, 3DS MAX</p>	<ol style="list-style-type: none"> <li>1.Execute the building drawing (Plan, Elevation and section) using CADD software for residential building</li> <li>2.Preparation of Footing layout and Centre line/ grid line marking of residential building on the field</li> </ol>
6	2	1,4,7	<p>Draw the following views for Commercial Buildings</p> <ol style="list-style-type: none"> <li>1. Plan</li> <li>2. Elevation</li> <li>3. Section</li> </ol>	<p>1.Create 3-D model of commercial buildings using software's like ARCHICAD, REVIT ARCHITECTURE, SKETCH UP, 3DS MAX.</p>	<ol style="list-style-type: none"> <li>1.Execute the building drawing (Plan, Elevation and section) using CADD software for commercial building.</li> <li>2.Preparation of Footing layout and Centre line/ grid line marking of commercial building on the field.</li> </ol>
7	2	1,4,7	<p>Draw the following views for Industrial Building having pitched roof.</p> <ol style="list-style-type: none"> <li>1. Plan</li> <li>2. Elevation</li> <li>3. Section</li> </ol>	<p>1.Create 3-D model of industrial buildings using software's like ARCHICAD, REVIT ARCHITECTURE, SKETCH UP, 3DS MAX.</p>	<ol style="list-style-type: none"> <li>1. Execute the building drawing (Plan, Elevation and section) using CADD software for industrial building</li> <li>2.Preparation of Footing layout and Centre line/ grid line of industrial building on the field</li> </ol>
8	3	1,4,7	<p>1. Introduction to plumbing: Pipe Materials used in building construction works for water supply work - Plastic Pipes, High Density Polyethylene Pipes, Densified cast iron pipes, GI pipes, Stoneware pipes, Asbestos Cement pipes, and Concrete pipes, Hot water pipes with insulation.</p> <p>2. Water supply fittings, their description and uses, water main, service pipes, supply pipe,</p>	<p>1. Conduct Market analysis on water supply fittings, fixtures, accessories, tools and equipment</p>	<ol style="list-style-type: none"> <li>1. Signs, Symbols and conventions of Water supply fittings and fixtures used for building service drawing.</li> <li>2. Demonstrate the water supply fittings,</li> </ol>



			<p>distribution pipe, domestic storage tank, stop cock, ferrule, gooseneck, water tap, aerators, water meter.</p> <p>3. Merits and Demerits. Connections from water main to buildings. Factors affecting the suitability of plumbing material and accessories for Water supply work, Water pressure test for leakage during installation of pipes.</p>	and prepare report.	fixtures, accessories, tools and equipment.
9	3	1,4,7	<p>1. Importance of Sanitary work for building. Different types of Sanitary pipes and pipe materials used in building construction works for drainage and waste disposal.</p> <p>2. Sanitary Fittings- Water Closets, Flushing Cisterns, Urinals, Inspection Chambers, Traps, Anti-syphonage. Connections from building to sewer main.</p> <p>3. Inspection, Testing and Maintenance of sanitary line in building. Factors affecting the suitability of sanitary material and accessories for Sanitary work.</p>	1. Conduct Market analysis on Sanitary fittings, fixtures, accessories, tools and equipment and present a report.	<p>1. Signs, symbols and conventions of Sanitary fittings and fixtures in building service drawing.</p> <p>2. Demonstrate the Sanitary fittings, fixtures, accessories, tools and equipment.</p>
10	3,4	1,4,7	<p>1. Wiring accessories: SP (single pole switch), DP (double pole switch), ICDP (Iron Clad Double Pole main switch), ICTP (Iron Clad Triple Pole switch), change over switch, modular switches, 2 pin socket, 3 pin socket, 2 pin plug top, 3 pin plug top, ceiling rose, round block, switch boards, switch plates, modular switch enclosures, blank insert gang box, junction box, fan box.</p> <p>2. Safety devices: Types of fuse units and Materials for fuse wire, Glass cartridge fuse, types of HRC fuse, Kit kat fuse. Types of MCB, MCCB, RCCB, ELCB Types of Earthing- Pipe earthing, Plate earthing, Lightning arrestors.</p> <p>3. Types of wiring systems and their applications: Surface conduit, concealed conduit, PVC casing capping. Types of wires, cables used for different current and voltage rating, Connection from Electric source to building based on electricity load.</p>	<p>1. Conduct Market analysis on Electrical wiring, fittings, fixtures, accessories, tools and equipment and present a report.</p> <p>2. Study on energy saving using Solar Panel installations with accessories in buildings.</p>	<p>1. Signs, symbols and conventions of Electrical wiring, fittings and fixtures in building service drawing.</p> <p>2. Conduct field visit to study plumbing and electrical installations in ongoing building constructions.</p>
11	3,4	1,4,7	<p>Building Basic Services</p> <p>1. Preparation of water supply Layout for residential building.</p> <p>2. Preparation of Sanitary Layout for residential building.</p>	1. Prepare basic service layouts like Water	1&2. Prepare basic service layouts like Water supply, Sanitary, Electrical layouts for

			3. Preparation of Electrical Layout for residential building.	supply, Sanitary, Electrical layout for your college building using any Application software and demonstrate.	residential building using AUTOCAD with layers.
1 2	3,4	1,4, 7	1 Fire classifications, Importance of providing Fire fighting system and fire safety requirements in Commercial and Industrial Building.  2.Components of the fire fighting system and its applications in Commercial and Industrial Building.  3. Location of fire fighting system, installations and Code of Practice for fire safety in different typologies of Buildings. Fire ratings.	1.Conduct Field visit and study the firefighting system installations , fire safety measures and demonstrate.	1 & 2 Prepare basic service layouts like Water supply, Sanitary, Electrical and Fire fighting system layouts for Multi-storeyed building using AUTOCAD using layers.
1 3	3,4	1,4, 7	1. Importance of conservation of rain water by Rain water harvesting unit in buildings. Components of the rainwater harvesting system.  2.Methods of Rainwater harvesting, Benefits of rainwater harvesting unit in buildings  3. Purpose of using Soak pit with Septic tank and Manhole and its sizing based on the requirement for different typologies of building.	1.Prepare Rain water harvesting unit layout for your college building using any Application software and demonstrate.	1. Prepare rainwater harvesting unit layout for residential building drawings in CADD 2. Execute septic tank with soak pit and manhole drawings for building drawings in CADD
<b>Total in hours</b>			<b>39</b>	<b>13</b>	<b>52</b>

**NOTE 1:** The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits.

**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty.

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

#### 5. Format for CIE written Test

Course Name	BUILDING DRAWING USING CADD	Test	I/II/III	Sem	III/IV
Course Code	20CE34P	Duration	80 Min	Marks	30
Note: Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions		Cognitive Levels	Course Outcome	Marks
I	1				
	2				
II	3				
	4				
III	5				
	6				
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.					

#### 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2

4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
	Average Marks= (8+6+2+2)/4=4.5						5

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

## 7. Reference:

Sl. No.	Description
1	Building Planning and Drawing- <b>S.S. Bhavikatti, M.V. Chitawadagi</b> , I. K International Publishing House Pvt.Ltd
2	Civil Engineering Drawing and design – <b>D.N. Ghose (CBS Publishers)</b>
3	A textbook of Draughtsman Civil (Theory and Practical) – <b>R.S. Mallik and G.S. Meo(Asian publishers, New Delhi)</b>
4	CAD in Civil Engineering a Laboratory Referral- <b>Dr M.A. Jayaram, D.S.Rajendra Prasad, Sapna Book House</b>
5	Making a simple floor plan using AUTOCAD <a href="https://www.youtube.com/watch?v=hO865EIE0p0&amp;t=384s">https://www.youtube.com/watch?v=hO865EIE0p0&amp;t=384s</a>

## 8. a. CIE Skill Test 1 - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Skill of using CADD commands	10
3	Preparation of 2D Building drawings (Residential/ commercial/industrial) using CADD Plan - 20 marks Elevation - 10 marks Section - 20 marks	50
4	Dimensioning and Detailing of the given drawing	20
5	Viva-Voce	10
Total Marks		100



### 8. b. CIE Skill Test 2 - SEE Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Skill of using CADD commands	10
3	a) Preparation of service layout for the 2D building PLAN - 20 marks b) (i) Water supply layout - 15 marks <b>OR</b> (ii) Sanitary layout - 15 marks c) (i) Electrical layout - 15 marks <b>OR</b> (ii) Fire fighting layout - 15 marks	50
4	Dimensioning and Detailing of the drawing -10 Tabulation of Symbols and sign conventions-10	20
5	Viva-Voce	10
Total Marks		100

#### **Note for the Examiner:**

1. The choice between the questions 3b and 3c shall be done by the examiner.

### 8. c. SEE - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Preparation of 2D Building drawings (Residential/ commercial/industrial) using CADD and Dimensioning and Detailing of the given drawing (Single line diagram). Plan - 20 marks Elevation - 10 marks Section - 20 marks	50
2	a) Preparation of service layout for the 2D building PLAN drawn in SI.NO. 1 b) (i) Water supply layout - 15 marks <b>OR</b> (ii) Sanitary layout - 15 marks c) (i) Electrical layout - 15 marks <b>OR</b>	30

	(ii) Firefighting layout - 15 marks	
3	Viva-Voce	20
Total Marks		100

**Note for the External Examiner:**

1. The choice between the questions 2b and 2c shall be done by the external examiner.

**9. Equipment/software list with Specification for a batch of 20 students**

Sl. No.	Particulars	Specification	Quantity
1	Computers with Latest Configuration	8 GB RAM, 512GB HARD DRIVE, i5 and above 2.5 GHz PROCESSOR	1/ student
2.	Any latest licensed Computer Aided Drafting Software	Ver.2020	1/ computer
3	Building Information Modelling softwares- ARCHICAD / REVIT ARCHITECTURE / 3DSMAX / SKETCHUP	Ver.2010 & above	1/ computer
4	Plotter of size A0	24 INCH LARGE FORMAT, THERMAL INKJET PLOTTER	1
5	LCD Projector	1800 Lumen   Large 120-inch Display Projection with HDMI + VGA + Aux + USB Connectivity	1
6	Power Backup	BATTERY + INVERTER	1
7	Stylus for drawing	Pen Deco01 V2 Digital Graphics Drawing Pen Tablet (10" x 6.25", 8192 Levels of Pressure Sensitivity, Battery-Free Passive Stylus	
8	Construction practice tool kit, Pegs, thread, trisquare, arrows, plumbing tool kit		5 set

## ಮೂರನೇ ಸೆಮಿಸ್ಟರ್

### ಕನ್ನಡ ಬಲ್ಲ ಡಿಪ್ಲೋಮಾ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

(ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ, ಸಂಸ್ಕೃತಿ ಮತ್ತು ಪರಂಪರೆ ಕುರಿತು)

Course Code	20KA31T	Semester : III	Course Group - AU
Course Title	ಸಾಹಿತ್ಯ ಸಿಂಚನ - 2	Category : Audit	Lecture Course
No. of Credits	2	Type of Course	CIE Marks : 50
Total Contact Hours	02 Hrs Per Week 26 Hrs Per Semester	Prerequisites Teaching Scheme (L:T:P)= 2:0:0	SEE Marks : Nil

### ಸಾಹಿತ್ಯ ಸಿಂಚನ - 2 ಪಠ್ಯಕ್ರಮ - 20KA31T

26 ಗಂಟೆಗಳು

ಪಠ್ಯಕ್ರಮದ ಪರಿವಿಡಿ	ಬೋಧನಾ ಅವಧಿ
1. ಹೊಸಗನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಪ್ರಭಾವಗಳು ಮತ್ತು ಪ್ರೇರಣೆಗಳು	01 ಗಂಟೆ
2. ಹೊಸಗನ್ನಡ ಕಾವ್ಯದ ಪ್ರಕಾರಗಳು -	02 ಗಂಟೆ
<ul style="list-style-type: none"> <li>• ನವೋದಯ ಸಾಹಿತ್ಯ - ಲಕ್ಷಣಗಳು ಮತ್ತು ಪ್ರೇರಣೆ, ಪ್ರಮುಖ ಕವಿಗಳು ಮತ್ತು ಸಾಹಿತ್ಯದ ಕೊಡುಗೆಗಳು.</li> <li>• ನವ್ಯ ಸಾಹಿತ್ಯ - ಲಕ್ಷಣಗಳು ಮತ್ತು ಪ್ರೇರಣೆ, ಪ್ರಮುಖ ಕವಿಗಳು ಮತ್ತು ಸಾಹಿತ್ಯದ ಕೊಡುಗೆಗಳು.</li> <li>• ಬಂಡಾಯ ಮತ್ತು ಪ್ರಗತಿಪರ ಸಾಹಿತ್ಯ - ಲಕ್ಷಣಗಳು ಮತ್ತು ಪ್ರೇರಣೆ, ಪ್ರಮುಖ ಕವಿಗಳು ಮತ್ತು ಸಾಹಿತ್ಯದ ಕೊಡುಗೆಗಳು.</li> <li>• ದಲಿತ ಸಾಹಿತ್ಯ, ಮಹಿಳಾ ಸಾಹಿತ್ಯ, ವಿಜ್ಞಾನ ಸಾಹಿತ್ಯ ಮತ್ತು ಇತ್ತೀಚಿನ ಪ್ರಚಲಿತ ಕನ್ನಡ ಸಾಹಿತ್ಯ - ಲಕ್ಷಣಗಳು ಮತ್ತು ಪ್ರೇರಣೆ, ಪ್ರಮುಖ ಕವಿಗಳು ಮತ್ತು ಸಾಹಿತ್ಯದ ಕೊಡುಗೆಗಳು.</li> </ul>	03 ಗಂಟೆ 03 ಗಂಟೆ 03 ಗಂಟೆ 03 ಗಂಟೆ
3. ವೈಚಾರಿಕತೆ ಕುರಿತಾದ ಲೇಖನ - ಜಿ ಎಸ್. ಶಿವರುದ್ರಪ್ಪ	01 ಗಂಟೆ
4. ಕಥೆ - ನೇಮಿಚಂದ್ರ	01 ಗಂಟೆ
5. ಪ್ರವಾಸ ಕಥನ - ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯರವರ (ಕುಪ್ಪಳಿ ಡೈರಿ ಪುಸ್ತಕದಿಂದ)	01 ಗಂಟೆ
6. ಪರಿಸರ, ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ ಕುರಿತಾದ ಲೇಖನಗಳು	01 ಗಂಟೆ
7. ಪ್ರಬಂಧ - ಗೊರೂರು ರಾಮಸ್ವಾಮಿ ಅಯ್ಯಂಗಾರ	01 ಗಂಟೆ
8. ಪ್ರಚಲಿತ ವಿದ್ಯಮಾನಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಲೇಖನ - "ಷೇರು ಮಾರುಕಟ್ಟೆ ಮತ್ತು ಹಣಕಾಸು ನಿರ್ವಹಣೆ" ಕುರಿತಂತೆ	01 ಗಂಟೆ
9. ಕರ್ನಾಟಕ ಏಕೀಕರಣ ಚಳುವಳಿ - ಪ್ರೊ. ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ	01 ಗಂಟೆ
10. ಕನ್ನಡ ಸಿನಿಮಾರಂಗ ಬೆಳೆದು ಬಂದ ದಾರಿ ಮತ್ತು ನಾಡು-ನುಡಿ ಹಾಗೂ ನಾಡಿನ ಸಂಸ್ಕೃತಿಯ ಮೇಲೆ ಬೀರಿದ ಪ್ರಭಾವಗಳು	01 ಗಂಟೆ
11. ಕನ್ನಡದ ಸಾಮಾಜಿಕ ಉಪಭಾಷೆಗಳು (ಭಾಷಾ ಪ್ರಭೇದಗಳು)	01 ಗಂಟೆ
12. ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಒಂದು ಅವಲೋಕನ	02 ಗಂಟೆ
<b>ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ 26 ಗಂಟೆಗಳು</b>	<b>26 ಗಂಟೆ</b>



**ಕನ್ನಡ ಬಾರದ / ಕನ್ನಡೇತರ ಡಿಪ್ಲೋಮಾ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಕನ್ನಡ ಕಲಿಸಲು  
ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ**

Course Code	20KA31T	Semester : III	Course Group - AU
Course Title	ಬಳಕೆ ಕನ್ನಡ - 2	Category : Audit	Lecture Course
No. of Credits	2	Type of Course	CIE Marks : 50
Total Contact Hours	2 Hrs Per Week 26Hrs Per Semester	Prerequisites Teaching Scheme (L:T:P)= 2:0:0	SEE Marks : Nil

**ಬಳಕೆ ಕನ್ನಡ - 2 ಪಠ್ಯಕ್ರಮ - 20KA31T**

**Table of Contents (ಪರಿವಿಡಿ)**

**26 ಗಂಟೆಗಳು**

<b>Part - 1</b>	<b>Teaching Hour</b>
Necessity of learning a local language (Continuation). Tips to learn the language with easy methods (Continuation). Easy learning of a Kannada Language: A few tips (Continuation). Hints for correct and polite conversation (Continuation). Instructions to Teachers for Listening and Speaking Activities (Continuation). Instructions to Teachers for Reading and Writing Activities (Continuation).	<b>01 Hour</b>
<b>Part - II</b>	
Key to Transcription for Correct Pronunciation of Kannada Language (Continuation). Instructions to Teachers to teach Kannada Language (Continuation).	<b>02 Hour</b>
<b>Part - III Lessons to teach Kannada Language (Speaking, Listening, Reading and Writing Activities with Explanation)</b>	
<b>Lesson - 1</b> Personal Pronouns, Possessive Forms, Interrogative words - Part II	<b>02 Hour</b>
<b>Lesson - 2</b> Permission, Commands, encouraging and Urging words (Imperative words and sentences) - Part II	<b>02 Hour</b>
<b>Lesson - 3</b> Comparative, Relationship, Identification and Negation Words - Part II	<b>02 Hour</b>
<b>Lesson - 4</b> Different types of forms of Tense (Use and Usage of Tense in Kannada) - Part II	<b>02 Hour</b>
<b>Lesson - 5</b> Kannada Helping Verbs in Conversation (Use and Usage of Verbs) - Part II	<b>02 Hour</b>
<b>Lesson - 6</b> Formation of Past, Future and Present Tense Sentences with Changing Verb Forms	<b>02 Hour</b>
<b>Lesson - 7</b> Karnataka State and General Information about the State	<b>02 Hour</b>
<b>Lesson - 8</b> Kannada Language and Literature	<b>02 Hour</b>
<b>Lesson - 9</b> Do's and Don'ts in Learning a Language	<b>02 Hour</b>
<b>PART - IV Reading and writing Practice of Kannada Language</b>	
<b>Lesson - 10</b> Kannada Language Script Part - 1	<b>02 Hour</b>
<b>Lesson - 11</b> Kannada Language Script Part - II (Continuation)	<b>02 Hour</b>
<b>Lesson - 12</b> Kannada Vocabulary List : ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು - Kannada Words in Conversation (Continuation).	<b>01 Hour</b>
<b>Total Teaching Hours</b>	<b>26 Hour</b>

ಸಾಹಿತ್ಯ ಸಿಂಚನ ಭಾಗ - II ಮತ್ತು ಬಳಕೆ ಕನ್ನಡ ಭಾಗ - II ಈ ಎರಡು ಪಠ್ಯಕ್ರಮಗಳಿಗೆ  
CIE - ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ ಮಾರ್ಗಸೂಚಿಗಳು :

**(Course Assessment and Evaluation Chart - CIE only)**

Sl. No	Assessment	Type	Time frame in semester	Duration In minutes	Max marks	Conversion
1.	CIE- Assessment - 1	Written Test - 1	At the end of 3 <sup>rd</sup> week	80	30	<b>Average of three written tests : 1, 2 &amp; 3 for 30 Marks</b>
2.	CIE- Assessment - 2	Written Test - 2	At the end of 7 <sup>th</sup> week	80	30	
3	CIE- Assessment - 3	Written Test - 3	At the end of 13 <sup>th</sup> week	80	30	
4.	CIE- Assessment - 4	MCQ/Quiz	At the end of 5 <sup>th</sup> week	60	20	<b>Average of three Assessment tests : 4, 5 &amp; 6 for 20 Marks</b>
5	CIE- Assessment - 5	Open Book Test	At the end of 9 <sup>th</sup> week	60	20	
6	CIE- Assessment - 6	Work book Consolidation & Activities	At the end of 11 <sup>th</sup> week	60 (Work book Submission)	20	
<b>Total CIE – Continuous Internal Evaluation Assessment Marks</b>						50
<b>Total Marks</b>						50

- ಸೂಚನೆ :**
1. CIE - ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ 1, 2 ಮತ್ತು 3 ರ ಕಿರು ಪರೀಕ್ಷೆಗಳನ್ನು ಮತ್ತು ಮೌಲ್ಯಮಾಪನದ 4, 5 ಮತ್ತು 6 ರ ಪರೀಕ್ಷೆಗಳನ್ನು ಪ್ರತ್ಯೇಕ ಬ್ಯಾಚುಕ್ ಪುಸ್ತಕದಲ್ಲಿ, ವಿದ್ಯಾರ್ಥಿಗಳು ಬರೆಯಬೇಕು.
  2. ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದಲ್ಲಿ, ವಿದ್ಯಾರ್ಥಿಗಳು, ತರಗತಿ ಕನ್ನಡ ಭಾಷಾ ಶಿಕ್ಷಕರಿಂದ ಮತ್ತು ವಿಭಾಗಾಧಿಕಾರಿಗಳಿಂದ ದೃಢೀಕರಣಗೊಂಡ ಕಾರ್ಯಪಠ್ಯಪುಸ್ತಕವನ್ನು (Work Book) ಮೌಲ್ಯಮಾಪನ ಭಾಗ- CIE- Assessment – 6 ರ ಪರೀಕ್ಷೆಯ ನಂತರ ಆಯಾ ವಿಭಾಗಕ್ಕೆ ಸಲ್ಲಿಸಬೇಕು.

# **4<sup>TH</sup> SEMESTER**



**Government of Karnataka  
DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	Fourth Semester
<b>Course Code</b>	20CE41P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Concrete Technology	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L: T:P :: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale:** Diploma holders in Civil Engineering are supposed to supervise concreting operations involving proportioning, mixing, transporting, placing, compacting, finishing and curing of concrete. To perform above functions, it is essential to impart knowledge and skills regarding ingredients of concrete and their properties; properties of concrete in fresh and hardened stage, water cement ratio and workability; proportioning for ordinary concrete; concreting operations and joints in concrete.

**2. Course Outcomes/Skill Sets:** At the end of this course students will be able to

CO-01	Identify the ingredients of concrete, test the properties and study the behaviour of concrete ingredients to ensure it can be used for the given construction activity
CO-02	Design concrete mix proportions for required compressive strength and perform appropriate concrete operation procedures under a given exposure condition.
CO-03	Identify the types of admixtures based on its properties, behaviour and determine the type of admixtures to be used in concrete for a given construction activity.
CO-04	Differentiate between special concrete and conventional concrete with regards to composition, its applications and sustainability along with advantages and disadvantages of both.

**3. Course Content**

Week	CO	PO		Lecture	Tutorial (Activity	Practice
				(Knowledge Criteria)	Criteria)	(Performance Criteria)



				3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)
1	1	1,4	1	Cement – Chemical composition, grades of cement, Tests on cement-fineness, normal consistency, specific gravity on cement.	1. Conduct field test on cement.  2. Conduct market analysis on price, grades and brand of cement.	1. a. Fineness test on Cement- sieve analysis by Blaine's air permeability test. 1.b. Normal Consistency test on cement.
			2	Setting time, Soundness and compressive strength of cement cube.		2. a. Initial setting time & final setting time test. 2.b. Specific gravity test on cement.
			3	Storing Cement: - (a) Storing of cement in the warehouse. (b) Storing of cement at site. (c) Effect of storage on strength of cement. Water -Quality of mixing water, Limits on the impurities as per ISI.		
2	1	1, 4	1	Fine aggregate – specific gravity, density, moisture content.	1. Conduct water absorption test on silt. 2. Compare properties of Manufactured sand with Natural River Sand	1. Test on Compressive strength of cement cube
			2	Bulking, sieve analysis, grading of fine aggregate, deleterious materials.		2. Fineness modulus, Specific gravity of fine aggregate
			3	Emerging trends in fine aggregate manufactured sand, P-sand, Filtered sand		
3	1	4	1	Coarse aggregate - Importance of size, shape and texture, grading of coarse aggregates.	1. Study on Recycled coarse aggregate and prepare a report.	1. Bulking of Fine Aggregate-River sand, M-Sand, P-Sand.
			2	Sieve analysis, specific gravity, flakiness and elongation index of coarse aggregate.		2. Fineness modulus, Specific gravity of coarse aggregate.
			3	Moisture test, Impact test and abrasion test of coarse aggregate Storing of coarse aggregate at site.		

4	2	1	1	Concrete, Behaviour of concrete- Hydration of cement, Bogue's compounds.	1. Study the advantages and uses of concrete in comparison to other building materials  2. Video demonstration on Hydration of cement and hydration process, Physical structure of hydrated cement	1. Flakiness Index, Elongation Index of coarse aggregate.
			2	Gel/space ratio, Water requirement for hydration, Water Cement Ratio.		2. Absorption test and surface moisture test on fine aggregate and coarse aggregates.
			3	Effect of various W/C ratios on the physical structure of hydrated cement.		
5	2	1,4	1	Internal moisture, temperature, age, and size of specimen, cube strength.	1. Prepare Comparison report on different grades of concrete based on workability.	1. Slump Test on concrete for the nominal mix.
			2	Workability – Factors affecting workability, measurement of workability, Segregation and bleeding.		2. Compaction factor test for the nominal mix.
			3	Strength-a) Characteristic strength, (b) Durability, (c) Permeability Factors affecting strength, w/c ratio, maturity, effect of aggregate properties.		
6	2	1, 4	1	Compressive strength, split tensile strength, bond strength, modulus of rupture.	1. Study and demonstrate Pull out test on concrete.	1. Compressive strength test on concrete - cube strength.
			2	Modulus of elasticity, Poisson ratio, the relationship between these parameters. Aggregate-cement bond strength.		2. Non-destructive test on concrete. a) Ultrasonic Pulse Velocity test. b) Rebound Hammer test.
			3	Shrinkage – plastic shrinkage and drying shrinkage, factors affecting shrinkage.		
7	2	1, 4	1	Creep – Factors affecting creep, effects due to the creep of concrete,		1. Site Visit/Demonstration-

				measurement of creep, Permeability in concrete.		Evaluation of Compressive strength by core cutter test.
			2	Factors contributing to cracks in concrete – Settlement cracks, Thermal expansion, and structural design deficiencies.	1. List the remedies for cracks in concrete.	2. Demonstration-Permeability test on concrete.
			3	Concrete in Aggressive Environment: Alkali – Aggregate Reaction, Sulphate Attack, Chloride Attack, Acid Attack, Effect of Sea Water, Carbonation, special coating for Waterproofing, Freezing and thawing.		
8	2	1,4	1	<p>CONCRETE OPERATIONS: -</p> <p>Batching</p> <p>(a) Batching of cement</p> <p>(b) Batching of aggregate: Batching by volume, using gauge box, selection of proper gauge box, Batching by weight-spring balances and by batching machines.</p> <p>(c) Measurement of water.</p>	<p>1.IS Codal provisions for mix design of concrete.</p> <p>2. Importance of bulking of sand in Volume batching</p>	1. Concrete Mix Design as per IS Codes.
			2	<p>Mixing</p> <p>(a) Hand mixing</p> <p>(b) Machine mixing-types of mixers, capacities of mixers, choosing appropriate size of mixers, operation of mixers, mixing of water.</p> <p>(c) Maintenance and care of machines.</p>		2. Preparation of gauge box Demonstration on Hand mixing and machine mixing.
			3	<p>Transportation</p> <p>Transportation with the use of the following- pans, wheelbarrows, transit mixers, chutes, belt conveyors, pumps, tower cranes.</p>		
9	2	1,4	1	<p>Ready Mix concrete</p> <p>Manufacturing of ready-mix concrete, Quality inspection of Ready-Mix Concrete in site.</p> <p>Precautions and care before, during and after concreting Using RMC</p>	1. Visit the construction site and study the concrete operations	1. Demonstration on volume batching in site and Weigh batching in

			2	<p>Compaction:</p> <p>(a) Hand compaction</p> <p>(b) Machine compaction-types of vibrators-internal and external vibrators</p> <p>Method of handling machine vibrators and its suitability for various situations.</p>	like batching, mixing, transportation, compaction, finishing and curing of concrete and prepare a report.	RMC(semi-automated and fully automated)
			3	<p>Finishing-screeding, floating, and towelling</p> <p>Curing: - Object of curing, Method of curing - conventional and advanced methods.</p> <p>Recommended duration for curing</p>		2. Prepare the trail mix for the mix design and conduct test in fresh state (slump and compaction factor test) and hardened state (Succeeding week)
10	3	1, 4,5	1	Mineral admixture- Fly Ash, its Composition, properties, uses and advantages	1. Study on Natural fibres and artificial fibres and prepare a report	1. Prepare mix design and Conduct Slump test and compaction factor test on fresh concrete with mineral admixtures
			2	GGBS-its Composition, properties, uses and advantages		2. Compressive strength test on hardened concrete with mineral admixture
			3	Silica fume- its Composition, properties, uses and advantages		
11	3	1,4,5	1	Chemical Admixture-Plasticizers, Super plasticizers- its Composition, properties, uses and advantages.	1. Conduct market analysis on chemical admixtures and compare.	1 & 2 Site visit to study the methodology of concrete Pumping to upper floors in construction site.
			2	Accelerators and Retarders- its Composition, properties, uses and advantages.		
			3	Air Entraining and Integral Waterproofing compounds- its Composition, properties, uses and advantages.		
12	3,4	1,4,5	1	High strength concrete, High performance Concrete-Ingredients and preparation, advantages and application.	1. Compare the special concrete with conventional	1 & 2: Prepare mix design and conduct Slump flow test, V Funnel Test, L Box

					concrete and prepare report	Test, U Box Test to determine workability of Self Compacted concrete.
			2	Pervious concrete, high density concrete. -Ingredients and preparation, advantages and application		
			3	Self-compacting concrete-Ingredients and preparation, advantages and application		
1 3	3,4	4, 5	1	Fibre reinforced concrete. - Ingredients and preparation, advantages and application	Study on Reactive powder Concrete, Roller Concrete, Epoxy concrete	1 & 2 Compressive strength test on special concrete
		2	Geopolymer concrete - Ingredients and preparation, advantages and application			
		3	Lightweight concrete-Ingredients and preparation, advantages and application			
<b>Total in hours</b>				<b>39</b>	<b>13</b>	<b>52</b>

**NOTE 1:** The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits

**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	

5	CIE-5 Skill Test-Practice	12	180	100	Average of two skill test reduced to 20
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

### 5. Format for CIE written Test

Course Name	<b>Concrete Technology</b>	Test	I/II/III	Sem	III/IV
Course Code	<b>20CE41P</b>	Duration	80 Min	Marks	30

**Note:** Answer any one full question from each section. Each full question carries 10 marks.

Section	Assessment Questions	Cognitive Levels	Course Outcome	Marks
I	1			
	2			
II	3			
	4			
III	5			
	6			

Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.

### 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2



4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
	Average Marks= (8+6+2+2)/4=4.5						5

**Note:** Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

### 7. Reference:

Sl. No.	Description
1	Concrete technology- MS Shetty , Chand S and Co.
2	Concrete Technology, Tata McGraw Hill, New Delhi
3	Concrete Technology - Theory & Practice - R.S. Varshney
4	Relevant BIS codes

### 8. a. CIE Skill Test 1 - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	<p>a. Fineness test on Cement- sieve analysis by Blaine's air permeability test / Normal Consistency test / Initial setting time test on cement</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Fineness modulus / Specific gravity/ Bulking of Fine aggregate (River sand / M-Sand / P-Sand)/ Absorption test and surface moisture test on fine aggregates</p> <p style="text-align: center;"><b>OR</b></p> <p>c. Fineness modulus / Specific gravity/ Flakiness Index, Elongation Index test/ Absorption test and surface moisture test on coarse aggregate</p> <p>Procedure-10 marks            Tabular column/observation-10 marks            Conduction of Experiment-10 marks            calculation and Results-10 marks</p>	40
3	<p>a. Slump test on conventional concrete for nominal mix</p> <p style="text-align: center;"><b>OR</b></p>	

	b. Compaction factor test on conventional concrete for nominal mix Procedure-10 marks Tabular column/observation-10 marks Conduction of Experiment-10 marks calculation and Results-10 marks	40
4	Viva	10
<b>Total Marks</b>		<b>100</b>

**Note for the Examiner:**

1. The choice among the questions 2a,2b and 2c shall be done by the examiner.
2. The choice between the questions 3a and 3b shall be done by the examiner.

**8. b. CIE Skill Test 2 - Scheme of Evaluation**

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Concrete Mix Design as per IS Codes for the given data	30
3	a. Slump test / Compaction factor test on concrete with mineral admixtures for trail mix  <b>OR</b> b. Prepare Concrete Mix design for self-compacting concrete as per IS Codes for the given data  Conduct test to determine workability of Self Compacting concrete: Slump test/ V Funnel Test / L Box Test / U Box Test for trail mix  Procedure-10 marks Tabular column/observation-10 marks Conduction of Experiment-20 marks calculation and Results-10 marks	50
4	Viva- voce	10
<b>Total Marks</b>		<b>100</b>

**Note for the Examiner:**

1. The choice between the questions 3a and 3b shall be done by the examiner.

### 8. c. SEE - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	<p>a. Fineness test on Cement- sieve analysis by Blaine's air permeability test / Normal Consistency test / Initial setting time test on cement</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Fineness modulus / Specific gravity/ Bulking of Fine aggregate (River sand / M-Sand / P-Sand)/ Absorption test and surface moisture test on fine aggregates</p> <p style="text-align: center;"><b>OR</b></p> <p>c. Fineness modulus / Specific gravity/ Flakiness Index, Elongation Index test/ Absorption test and surface moisture test on coarse aggregate</p> <p>Procedure-10 marks            Tabular column/observation-10 marks            Conduction of Experiment-10 marks            Calculation and Results-10 marks</p>	40
2	<p>a. Prepare Concrete Mix design and conduct Slump test / Compaction factor test on concrete with mineral admixtures for trail mix</p> <p style="text-align: center;"><b>OR</b></p> <p>b. Prepare Concrete Mix design for self-compacting concrete as per IS Codes for the given data</p> <p>Conduct test to determine workability of Self Compacting concrete: Slump test/ V Funnel Test / L Box Test / U Box Test for trail mix</p> <p>Mix design -20 marks            Conduction of Experiment-10 marks            Calculation and Results-10 marks</p>	40
5	Viva- voce	20
<b>Total Marks</b>		<b>100</b>

**Note for the External Examiner:**

- The choice among the questions 1a,1b and 1c shall be done by the external examiner.
- The choice between the questions 2a and 2b shall be done by the external examiner.

### 9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Blaine's air permeability test apparatus		10
2	Sieve analysis apparatus for Cement		10
3	Vicat Apparatus		10
4	Pycnometer		10
5	Density bottle		10
6	UTM		1
7	CTM		1
8	Slump test apparatus		5
9	Flakiness index apparatus		10
10	Elongation index apparatus		10
11	Sieve analysis for fine aggregate		10
12	Sieve analysis for Coarse aggregate		10
13	UPV apparatus		1
14	Digital Rebound Hammer		2
15	Core cutter apparatus		1
16	Compaction factor test apparatus		4



**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	Fourth Semester
<b>Course Code</b>	20CE42P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Building Estimation & Valuation	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L:T:P :: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale:** The procedure of calculating the measures as per the working drawings and cost of various construction items is called an Estimate. Before initiating the construction works, the contractor/ owner should have thorough knowledge of the amount of work which is to be done and it's costing. For this purpose, it is very essential to have an estimated quantity of work and the total amount it is going to cost. Estimation helps us in knowing the quantity of work, labour, materials and funds that will be required for the entire project thus enabling us to be prepared beforehand. Valuation is the technique of estimation or determining the fair price or value of property such as land, a building, a factory, other engineering structures of various types, etc. Valuation of building or property is the method of calculating the present marketable cost of a building. Valuation of a building depends on the sort of building, its structure, durability, location, size, shape, and the width of roads, frontage, types and quality of building materials used and the cost of these materials. It is expected the students should know the basics of the same to apply it in the field. Through this course students will develop the desired skills and competencies which are expected from them for Estimation and valuation related works.

**2. Course Outcomes/Skill Sets:** At the end of the semester student will be able to:

CO-01	Study the importance of estimation and detailed specifications for the various items required for construction of different types of structures.
CO-02	Analyse the rates and study factors affecting the rates for all works by applying standard rates for a given construction project.
CO-03	Prepare Bill of materials, Bill of Quantities and valuation report for a given construction project.
CO-04	Prepare contract documents for a given construction project with Negotiation and project financing skills

### 3. Course Content

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week(2 hours/batch twice in a week)
1	1,2	1,2 ,4, 7	<p>1.INTRODUCTION TO ESTIMATION Types of estimates. Roles and responsibility of estimator, Different items of works, unit of measurement and units of payment of different items of work, Bill of Quantities</p> <p>2.ANALYSIS OF RATES, purpose, importance and Procedure for rate analysis, rates of different construction materials, Categories of labours and their skills, number of labours and daily wages for different items of work,</p> <p>3.Load carrying capacity of different types of vehicles, transportation of materials and their hiring charges., GST charges, lead, lift, overhead charges, water charges and contractor's profit. factors affecting rate analysis</p>	<p>1. Prepare detailed report on Specifications of different items of work and study the importance of specification in Bill of Quantities</p> <p>2. Analyse the rates for reusable materials in different construction activities</p>	<p>1. SPECIFICATIONS Earthwork in excavation for foundation, Cement concrete in foundation, Brick masonry, R.C.C Work, Plastering in Cement mortar, pointing with cement mortar, Cement concrete flooring, Granite / Vitrified / Marble flooring</p> <p>2. Centering and shuttering works, Distempering, Exterior painting (Cement), Woodwork for windows and doors, Painting woodwork and steel, Glazing works for building, waterproofing systems</p>
2	2	1,2 ,4, 7	<p>Method of Analysis of rates for the following items of works</p> <p>1. a) Earthwork excavation and filling b) Cement concrete bed in foundation c) Size stone masonry in Cement mortar for substructure</p> <p>2. a) Brick masonry in C.M for superstructure b) Hollow concrete block masonry in Cement Mortar c) Solid concrete blocks masonry in Cement mortar for superstructure</p> <p>3. a) Pointing with cement mortar b) Plastering with cement mortar c) Waterproofing - Terrace, bathrooms and toilets.</p>	<p>1. Conduct market analysis on the present rate of materials, Daily wages of labours, number of labours, transportation charges, hire charges for tools and equipment's for different items of work and Compare with the Standard</p>	<p>1 &amp;2. Collect the present detailed Schedule of Rates and execute rate analysis in spreadsheet (For the lecture content for week 2)</p>



				Schedule of rates	
3		1,2,4,7	<p>Method of Analysis of rates for the following items of works</p> <ol style="list-style-type: none"> <li>1. a) CC Flooring, Granite / Vitrified / Marble flooring               <ol style="list-style-type: none"> <li>b) Painting of wall surface</li> <li>c) Painting of old and new wood work</li> </ol> </li> <li>2. a) Painting of Steel work               <ol style="list-style-type: none"> <li>b) Panelled and glazed doors</li> </ol> </li> <li>3. a) Panelled and glazed windows               <ol style="list-style-type: none"> <li>b) R.C.C roof slab</li> <li>c) Corrugated galvanized iron sheet roofing.</li> </ol> </li> </ol>	<p>1. Prepare the rate analysis for different items of work by changing cost of materials and profit percentage and compare</p>	<p>1 &amp; 2. Collect the present detailed Schedule of Rates and execute rate analysis in spreadsheet (For the lecture content for week 3)</p>
4	3	1,2,4,7	<ol style="list-style-type: none"> <li>1. Introduction to methods of estimation: long wall short wall method and centre line method of estimation, Standard Format for measurement sheet, Rules for deduction of doors, windows and opening in Masonry work, Plastering and Painting work</li> <li>2. One room building- Ground floor with flat RCC roof (Long wall short wall method)</li> <li>3. Two room building- Ground floor with pitched roof (Centre line method)</li> </ol>	<ol style="list-style-type: none"> <li>1. Extract measurements from existing AUTOCAD drawing file</li> <li>2. Compare between long wall short wall method and centre line method of estimation</li> </ol>	<ol style="list-style-type: none"> <li>1. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for One room building- Ground floor with flat RCC roof (Long wall short wall method)</li> <li>2. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for Two room building- Ground floor with pitched roof (Centre line method)</li> </ol>
5	3	1,2,4,7	<p>Explain the methodology of Quantity estimation of the following.</p> <ol style="list-style-type: none"> <li>1. Detailed and abstract estimate of buildings using long wall short wall Method - 1BHK Residential building - Ground floor with Pitched roof with load bearing wall.</li> <li>2. Detailed and abstract estimate of buildings using long wall short wall Method - 2BHK Residential building - Ground floor with flat RCC roof having semi-circular/ Hexagonal room walls (load bearing walls).</li> </ol>	<ol style="list-style-type: none"> <li>1. Prepare the BOQ for the residential building drawing from real time projects (ongoing construction projects) using Spreadsheet</li> <li>2. Extract measurements from existing</li> </ol>	<ol style="list-style-type: none"> <li>1. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for 1 BHK Residential building - Ground floor with Pitched roof with load bearing wall.</li> <li>2. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for 2BHK Residential building - Ground floor</li> </ol>

			3. Detailed and abstract estimate of buildings using long wall short wall Method -2BHK Residential building - Ground floor with flat RCC roof with portico / canopy.	AUTOCAD drawing file.	with flat RCC roof for with portico / canopy having semi-circular/ Hexagonal room walls
6	3	1,2,4,7	<p>Explain the methodology of Quantity estimation of the following.</p> <p>1.Detailed and abstract estimate of buildings using long wall short wall Method for Commercial building – Ground floor with flat RCC roof involving Aluminium Composite panels for facing</p> <p>2 &amp; 3: Detailed and abstract estimate of buildings using long wall short wall Method Industrial building – (Ground floor +1) with flat RCC roof and framed structure</p>	<p>1.Prepare the BOQ for the Commercial building drawing from real time projects (ongoing construction projects) using Spreadsheet</p> <p>2. Extract measurements from existing AUTOCAD drawing file</p>	<p>1. Execute the detailed and abstract estimate using long wall short wall method in using spreadsheet for School building – Ground floor with flat RCC roof</p> <p>2. Execute the detailed and abstract estimate using long wall short wall method using spreadsheet for Industrial building – (Ground floor +1) with flat RCC roof and framed structure</p>
7	3	1,2,4,7	<p>Explain the methodology of Quantity estimation of the following.</p> <p>1. Detailed and abstract estimate of buildings using Centre Line Method - 1BHK Residential building - Ground floor with Pitched roof with load bearing wall.</p> <p>2.Detailed and abstract estimate of buildings using Centre Line Method - 2BHK Residential building - Ground floor with flat RCC roof having semi-circular/ Hexagonal room walls (load bearing walls)</p> <p>3. Detailed and abstract estimate of buildings using Centre Line Method - 2BHK Residential building - Ground floor with flat RCC roof with portico / canopy</p>	<p>1. Prepare the BOQ for the Industrial building drawing from real time projects (ongoing construction projects) using Spreadsheet</p> <p>2. Extract measurements from existing AUTOCAD drawing file</p>	<p>1. Execute the detailed and abstract estimate using the Centre Line method using spreadsheet for 1 BHK Residential building - Ground floor with Pitched roof with load bearing wall.</p> <p>2. Execute the detailed and abstract estimate using Centre Line Method in using spreadsheet for 2BHK Residential building - Ground floor with flat RCC roof with portico / canopy having semi-circular/ Hexagonal room walls</p>
8	3	1,2,4,7	Explain the methodology of Quantity estimation of the following.	1.Prepare comparison statement with BOQ of	1. Execute the detailed and abstract estimate using centre line method using spreadsheet for School

			<p>1.DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS USING Centre line Method Commercial building – Ground floor with flat RCC roof involving structural glazing for facing</p> <p>2 &amp; 3: DETAILED AND ABSTRACT ESTIMATE OF BUILDINGS USING Centre Line Method Industrial building – (Ground floor +1) with flat RCC roof and framed structure</p>	<p>residential, commercial and industrial buildings</p> <p>2. Study on application of various softwares used for estimation and demonstrate</p>	<p>building – Ground floor with flat RCC roof</p> <p>2. Execute the detailed and abstract estimate using centre line method using spreadsheet for Industrial building – (Ground floor +1) with flat RCC roof and framed structure</p>
9	3	1,2,4,7	<p>Prepare the Bill of materials for the following in residential building</p> <ol style="list-style-type: none"> <li>1. Water supply fittings and fixtures</li> <li>2. Sanitary Fittings and fixtures</li> <li>3. Electrical Fittings and fixtures and fire fighting system</li> </ol>	<p>1. Conduct market analysis and prepare the rate analysis for plumbing, electrical and firefighting fixtures and fittings work</p> <p>2. Extract measurements from existing AUTOCAD drawing file</p>	<p>1. Execute the detailed and abstract estimate using spreadsheet for Plumbing layout (Water supply and sanitary fittings ) for residential building</p> <p>2. Execute the detailed and abstract estimate using spreadsheet for Electrical and fire fighting fittings for residential building</p>
10	3	1,2,4,7	<p>Prepare the Bill of materials for the following in Commercial building</p> <ol style="list-style-type: none"> <li>1. Water supply fittings and fixtures</li> <li>2. Sanitary Fittings and fixtures</li> <li>3. Electrical Fittings and fixtures and fire fighting system</li> </ol>	<p>Prepare the Bill of materials, detailed and abstract estimate for the following in Industrial building</p> <ol style="list-style-type: none"> <li>1. Water supply fittings and fixtures</li> <li>2. Sanitary Fittings and fixtures</li> <li>3. Electrical Fittings and fixtures and fire fighting system</li> </ol>	<p>1. Execute the detailed and abstract estimate using spreadsheet for Plumbing layout (Water supply and sanitary fittings) for commercial building</p> <p>2. Execute the detailed and abstract estimate using spreadsheet for Electrical and firefighting fittings for commercial building</p>

1 1	3	1,2 ,4, 7	<p>Prepare the Bill of materials for the following for a residential building</p> <ol style="list-style-type: none"> <li>1. Septic tank with soak pit</li> <li>2. Manhole</li> <li>3. Rain water harvesting unit</li> </ol>	<p>1. Prepare Bill of materials, detailed and abstract estimate for rainwater harvesting unit in college campus</p>	<ol style="list-style-type: none"> <li>1. Execute the detailed and abstract estimate using spreadsheet for) for septic tank with soak pit and manhole</li> <li>2. Execute the detailed and abstract estimate using spreadsheet for Rain water harvesting unit for a residential building</li> </ol>
1 2	4	1,2 ,4, 7	<ol style="list-style-type: none"> <li>1. Quotation preparation, Importance of Specification, rate analysis and quantity estimation in preparation of quotation, Negotiation with stakeholder in terms of estimation, Factors affecting negotiation</li> <li>2. Project Financing: Factors affecting project financing, different types of loans for project , Loan agreement and Agreement with the stakeholder, Documents to be produced to stakeholder and loan approval, Repayment of loan</li> <li>3. Work order, Payment Schedule: Advance payment, payment according to area of work, payment according to floor wise work, Retention details</li> </ol>	<p>1. Conduct a Detailed study about Negotiation and Project financing for an ongoing project and prepare a report</p>	<ol style="list-style-type: none"> <li>1. Preparation of complete report having survey drawings, working drawings, BOQ, detailed and abstract estimate, payment schedule and work order for project</li> </ol>
1 3	5	1,2 ,4, 7	<p>VALUATION</p> <ol style="list-style-type: none"> <li>1. Necessity of valuation, Important terms used in valuation, Scrap value, Salvage value, Market value, Book value and sinking fund.</li> <li>2. Depreciation, Classification of buildings based on the life of a building and depreciation.</li> <li>3. Methods of valuation &amp; Fixation of rents.</li> </ol>	<p>1. Study factors for real time valuation of building / land and prepare report</p>	<ol style="list-style-type: none"> <li>1. Execute the calculations of sinking fund and valuation of building using depreciation method using spreadsheet</li> <li>2. Execute the calculation of rent fixation using spreadsheet</li> </ol>
Total in hours			39	13	52

**NOTE 1:** NOTE 1: The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits

**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

#### 5. Format for CIE written Test

Course Name	<b>Estimation &amp; Valuation</b>	Test	I/II/III	Sem	III/IV
Course Code	<b>20CE42P</b>	Duration	80 Min	Marks	30
Note: Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions	Cognitive Levels	Course Outcome	Marks	
I	1				
	2				
II	3				
	4				
III	5				
	6				
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.					

## 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
	Average Marks= (8+6+2+2)/4=4.5						5

Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

## 7. Reference:

Sl. No.	Description
1	Dutta B N, "Estimation and costing in civil engineering theory and practice", 27 edition, UBS Publishers Distributors (P) Ltd New Delhi. Chakra borty M, "Estimating, costing and specifications in Civil Engineering"-2006.
2	D.D.Kohli Ar.R.C.Kohli, "Estimating and Costing(CIVIL)"2013 edition, S.CHAND Publications
3	IS: 1200 Part 1 to 28, Method of Measurement of Building and Civil Engineering Works.
4	Rangwala S C, "Valuation of Real properties"Charotar Publishing House -2008.
5	Full building estimation in spreadsheet <a href="https://www.youtube.com/watch?v=ocZu5wjh-88">https://www.youtube.com/watch?v=ocZu5wjh-88</a>

## 8. a. CIE Skill Test 1- Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Prepare rate analysis using present rates in spreadsheet for the given item of work	20



3	Prepare the Bill of Quantities in spreadsheet for the given Residential building drawing – For any FIVE given items of works using long wall short wall method.	30
4	Prepare the Bill of Quantities in spreadsheet for the given Commercial / Industrial building drawing – For any FIVE given items of works using long wall short wall method.	30
5	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

### 8. b. CIE Skill Test 2- Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Prepare the Bill of Quantities in spreadsheet for the given Residential/ Commercial / Industrial building drawing – For any FIVE given items of works using Centre line method	20
3	Prepare the Bill of materials and Bill of Quantities in spreadsheet for the given Residential/ Commercial service layout drawing – (Water supply / Sanitary Electrical / Firefighting layout)  Bill of materials - 10 marks Bill of Quantities - 20 marks	30
4	Prepare the Bill of materials and Bill of Quantities in spreadsheet for the given drawing – (Septic tank with soak pit / Manhole / Rain water harvesting unit)  Bill of materials - 10 marks Bill of Quantities - 20 marks	30
5	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

### 8. c. SEE Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Prepare rate analysis using present rates in spreadsheet for the given item of work	10
2	Prepare the Bill of Quantities in spreadsheet for the given Residential/ Commercial / Industrial building drawing – For any FIVE given items of works using Centre line / Long wall short wall method.	30
3	Prepare the Bill of materials and Bill of Quantities in spreadsheet for the given Residential/ Commercial service layout drawing – a. Water supply / Sanitary Electrical / Firefighting layout <b>OR</b> b. Septic tank with soak pit / Manhole / Rain water harvesting unit Bill of materials - 10 marks Bill of Quantities - 20 marks	30
4	Execute the valuation of building / valuation of land / rent fixation in spreadsheet for the given data.	10
5	Viva-Voce	20
<b>Total Marks</b>		<b>100</b>

**Note for the External Examiner:**

1. The choice between the questions 3a and 3b shall be done by the external examiner.

### 9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Computers with Latest Configuration	8 GB RAM, 512GB HARD DRIVE, i5 and above 2.5 GHz PROCESSOR	1/STUDENT
2	licensed MS OFFICE	Latest version	1/COMPUTER
3	Power Backup	BATTERY + INVERTER	1



**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	Fourth Semester
<b>Course Code</b>	20CE43P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Site Management	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L:T:P :: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale:** Site management is a key element of the integrated project team. Site management is beneficial to society as the effective and efficient management of construction projects which will avoid escalation of costs, time overrun, wastage of resources, unlawful exploitation of labour and pollution of environment and safety precautions. Site management makes sure that the various tasks are conducted smoothly. Without site management, workers might not be authorized to work on their appointed tasks on time, equipment might not be distributed etc. It is expected that the students should know the basics of the same to apply it in the field. Through this course students will develop the desired skills and competencies which are expected from them for site management related works

**2. Course Outcomes/Skill Sets:** At the end of the semester, students will be able to

CO-01	Prepare a construction site plan on a project-specific basis to include phasing, temporary utilities and facilities, vertical and lateral transportation, storage facilities, security, safety, lighting, and environmental requirements.
CO-02	Manage staffing requirements including hiring, replacement and clearly articulate the roles of each individual recruited to operate while managing specific activities of construction at a given project site.
CO-03	Collect data and perform calculations periodically to enable an estimator to propose alternative construction methods, the right labour mix, equipment utilization and quality of construction for a given construction project.
CO-04	Implement an effective communication system, rigorous record keeping, safe keeping on site of product samples, project submittals, drawings etc and ensure compliance with safety norms as per OHSAS standards.

### 3. Course Content

Week	CO	PO	Lecture (Knowledge Criteria)	Tutorial (Activity Criteria)	Practice (Performance Criteria)
			3 hours/week	1 hour/week	4 hours/week (2 hours/batch twice in a week)
1	01	1,6	<b>MOBILIZATION AND JOB LAYOUT</b> 1. Concept of Key Plan & Job plan. Mobilization of construction sites.  2. Role of the owner, contractor & designer. Organization chart for private & government bodies.  3. Work Breakdown Structure, Turnkey operation.	1. Study and prepare a report on Mobilization work and job layout for different types of buildings.	1. Preparation of Key Plan, Job Layout using BIM tool like Revit/Sketch up/AutoCAD.  2. Presentation on work breakdown structure & organization structure.
2	01, 02	1,3, 6	1. Preparation of a layout plan for a residential area showing LIG, MIG and HIG houses and other amenities.  2. Preparation of a layout plan for an industrial area.  3. Concept of Bidding, Bid Terminologies, Bid Template, Bid form.	1. Collect a case study on bidding and prepare a report.	1. Collect local body by law & prepare a layout plan for LIG, MIG & HIG of small residential area using AutoCAD/Sketch up/Revit  2. Collect local bodies by law & prepare a layout plan for industrial areas using AutoCAD/Sketch up/Revit.
3	02	1,2, 6,7	1. <b>CONTRACT &amp; TENDERING:</b> -Types of contracts, contract agreement, Tender- Pre tender & Post tender planning.  2. Procedure for inviting tender- Tender Notice & Tender documents, E-tendering process, E-procurement system.	1. Study on Project Feasibility. BOT, BOOT, PPP. and prepare a report	1. Procedure for uploading a tender in e-procurement.  2. Prepare & present process of tender/E-tender.

			3. Acceptance of contract documents and issue of work orders, duties and liabilities, completion certificate, right of contractor, refund of deposit.		
4	02	2,6,7	<p>1. EMD, Security deposit &amp; Guaranties, Scrutiny of Tenders</p> <p>2. Tender forms, comparative statements, administrative approval, technical sanction</p> <p>3. Conditions for failure of contract and its extension, Termination of contract</p>	1. Prepare & present tender documents	<p>1. Prepare comparative statements of tender and checklist for applying &amp; selecting Tender.</p> <p>2. Prepare administrative approval &amp; Technical approval report of any public/resident/industrial building.</p>
5	03	1,2,6,7	<p>1. Nominal muster roll, measurement book, method of recording bills.</p> <p>2. Pre-Measurements, check measurements, preparation of bills (Concept of RA bill- submission, scrutiny and payment.)</p> <p>3. Ledger accounts, Imprest Account, Cashbook, Suspense classification, Term DPR (daily productivity report), importance of DPR</p>	<p>1. Site visit &amp; data collection.</p> <p>2. Prepare &amp; present procedure of DPR.</p>	<p>1. Collect &amp; study measurement books of any residential building, industrial building &amp; public building.</p> <p>2. Collect &amp; study Cash Book, RA bill &amp; Ledger account.</p>
6	03,04	1,6	<p>1. STORES-Classification of Stores. Issues, Indents &amp; Bin cards - maintenance inspection, inventories.</p> <p>2. Work procedures adopted in P.W.D, KUWSSB, Irrigation, ZP, CMC and C.P.W.D.</p> <p>3. Site Order book, Hindrance Register, Drawing Register.</p>	<p>1. Site visit &amp; data collection.</p> <p>2. Prepare drawing register, site order, bin card</p>	<p>1. snagging checklist (Snagging1-upto door &amp; window clearance Snagging2-upto paint clearance Snagging3-Joint/grout filling clearances Snagging4-handover clearance).</p> <p>2. Prepare working procedure of</p>

			Project clearance procedure: Term Snagging, stages of snagging. Tools used for snagging.		government organization & responsibilities of technocrats.
7	04	2,4,6,7	<ol style="list-style-type: none"> <li>1. Introduction to Building Information Model (BIM), Introduction to project management tools like ERP, SAP, PRIMAVERA, MSP, Project Kick start, Smarta etc.</li> <li>2. Sequence of construction activity.</li> <li>3. PLANNING AND SCHEDULING: Project Organization</li> </ol>	<ol style="list-style-type: none"> <li>1. Conduct a Case study on Project Management tools like ERP, R CONSTRUCT, QUADRA, SAP, MSP, PRIMAVERA etc..</li> </ol>	<ol style="list-style-type: none"> <li>1.Prepare schedule for any building from mobilization to Lintel work using MS project/PRIMAVERA</li> <li>2.Prepare schedule for any building(continue) from Lintel to Slab casting using MS project/PRIMAVERA</li> </ol>
8	04	2,4,6,7	<ol style="list-style-type: none"> <li>1. Bar Charts. Gantt chart</li> <li>2. Networking techniques</li> <li>3. Development of a network using CPM with simple problems.</li> </ol>	<ol style="list-style-type: none"> <li>1.Site visit</li> </ol>	<ol style="list-style-type: none"> <li>1.Prepare schedule for any building (continuous) slab casting to door &amp; window fixing using MS project/PRIMAVERA</li> </ol>
9		2,4,6,7	<ol style="list-style-type: none"> <li>1. Line of Balance Scheduling</li> <li>2.Simple problem on PERT</li> <li>3. Time-Cost Trade-off, Cost Control in Construction. Importance of Management Information System.</li> </ol>	<ol style="list-style-type: none"> <li>1.Site visit &amp; data collection</li> <li>2. Prepare Working tracking report using spreadsheet.</li> </ol>	<ol style="list-style-type: none"> <li>1.Prepare schedule for any building(continue)from door &amp; window fixing to hand over using MS project/PRIMAVERA</li> </ol>
10	02,04	3,6,7	<ol style="list-style-type: none"> <li>1. RESOURCE MANAGEMENT: Resource Planning, allocation and levelling.</li> <li>2. Introduction to Material Management, Purchase management and inventory control.</li> <li>3. Importance of PR (Purchase request), PO (Purchase order), WO (work order), GRN (goods received note).</li> </ol>	<ol style="list-style-type: none"> <li>1. Site visit.</li> </ol>	<ol style="list-style-type: none"> <li>1 Site visit &amp; prepare Lead time chart for A, B &amp; C class materials &amp; link with scheduling.</li> <li>2. Calculate man hours for construction activity &amp; link with scheduling.</li> </ol>



11	05	5,6,7	<p>1.ENVIRONMENTAL HEALTH AND SAFETY(EHS): ACCIDENTS-definition of accident terms: (Partial &amp; total disablement, Injury frequency rate, injury severity rate).</p> <p>2. Accident- Causes, Precaution &amp; Prevention in each construction activity. Hazards on Construction Sites</p> <p>3. SAFETY- Importance of safety. Safety procedures and checklist for each construction activities as per OHSAS</p>	<p>1. Case study on hazards in construction.</p> <p>2. Demonstrate on Safety measures in construction site personal protective kit, Tool kits according to construction activity</p>	<p>1 &amp; 2. Site visit &amp; Prepare safety checklist for construction activity.</p>
12	03,04	5,6,7	<p>1. Safety meetings, Safety measures for storage, handling of building material and execution.</p> <p>2. QUALITY MANAGEMENT: Total Quality Management (TQM)- Introduction, Importance &amp; Functions of total quality management in the construction industry.</p> <p>3. Tools for quality control, Elements and requirements of quality management.</p>	<p>Study the advanced techniques used to improve the quality of construction.</p>	<p>1.Field visit and demonstration</p> <p>2.Prepare Third- party certification, Concept of ISO, Features of ISO9000 series, Benefit of ISO9000(ISO Certification, NABL certification)</p>
13	03,04	2,5,6,7	<p>1. Aims and ways of TQM. BIS certification of quality system.</p> <p>2.Claims, compensation and disputes, Dispute resolution techniques, Introduction to Arbitration and Conciliation Act 1996 – case studies</p> <p>3.Acts &amp; Labour Laws</p>	<p>Site visit &amp; data collection</p>	<p>1 &amp; 2: Case study on preparation of technology manual for each activity</p>
<b>Total in hours</b>			<b>39</b>	<b>13</b>	<b>52</b>

**NOTE 1:** The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits

**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	
6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

#### 5. Format for CIE written Test

Course Name	<b>Site Management</b>	Test	I/II/III	Sem	III/IV
Course Code	<b>20CE43P</b>	Duration	80 Min	Marks	30
<b>Note:</b> Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions		Cognitive Levels	Course Outcome	Marks
I	1				
	2				
II	3				
	4				
III	5				
	6				
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.					

## 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
Average Marks= (8+6+2+2)/4=4.5							5

**Note:** Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

## 7. Reference:

Sl. No.	Description
1	<b>Town Planning</b> by Rangwala
2	Collier, Kieth, " <b>Managing Construction Contracts</b> "
3	Gajaria GT, " <b>Law Relating to Building &amp; Civil Engg. Contracts in India</b> "
4	Frank Harris and Roland McCaffer, "Modern Construction Management" - 4th Ed. Blackwell Science Ltd. 2009
5	Chitkara K K, " <b>Construction Project Management, Planning, Scheduling and Controlling</b> , McGraw Hill Education, 3rd Ed., 2014
6	Srinath L.S, " <b>PERT and CPM</b> ", East West Press Pvt Ltd New Delhi
7	Peurifoy. R L, " <b>Construction Planning, Equipment and Methods</b> "- McGraw Hill.
8.	<a href="http://www.eprocure.gov.in">www.eprocure.gov.in</a>
9.	<a href="http://www.OHSAS.co.in">www.OHSAS.co.in</a>
10.	ISM codes (International safety management)

## 8 a. CIE Skill Test 1 - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
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1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Preparing Key Plan, Job Layout using Revit/Sketch up/CAD.	20
3	Prepare work breakdown structure of construction work & organization structure (private or government) using cadd or ms word	20
4	Write an e procurement procedure & prepare a checklist before, during & after applying e tender.	20
5	Prepare check list of snagging1 / snagging2 / snagging3 and 4 using MS office	20
6	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

#### 8. b. CIE Skill Test 2 - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria ( Observations and report )	10
2	a. Prepare schedule for any building from mobilization to Lintel work using MS project/PRIMAVERA  <b>OR</b> b. Prepare schedule for any building(continue) from Lintel to Slab casting using MS project/PRIMAVERA	20
3	a. Prepare schedule for any building(continue)slab casting to door & window fixing using MS project/PRIMAVERA  <b>OR</b>	20

	b. Prepare schedule for any building(continue)from door & window fixing to hand over using MS project/PRIMAVERA	
4	Prepare a safety checklist for excavation, SSM, BBM or scaffolding, centering, form work.	20
5	Prepare a safety checklist for plastering, roofing, flooring, painting works & Prepare Third- party certificate using ms office.	20
6	Viva-Voce	20
<b>Total Marks</b>		<b>100</b>

**Note for the Examiner:**

1. The choice between the questions 2a and 2b shall be done by the examiner.
2. The choice between the questions 3a and 3b shall be done by the examiner.

**8. c. SEE Scheme of Evaluation**

SL. No.	Particulars/Dimension	Marks
1	a. Preparing Key Plan, Job Layout using Revit/Sketch up/CAD <b>OR</b> b. Prepare work breakdown structure of construction work & organization structure (private or government) using AutoCAD or MS office.	20
2	Prepare a checklist of snagging1 / snagging2 / snagging3&4 using MS office.	10
3	Prepare schedule for any construction building work using MS project/PRIMAVERA	30
4	Prepare a safety checklist for any THREE of the following activities.  a. Excavation b. Foundation c. SSM d. BBM/Block Masonry e. Scaffolding f. Formwork g. Roofing	20

	h. Flooring, painting works. Prepare Third- party certificate using ms office.	
5	Viva-Voce	20
<b>Total Marks</b>		<b>100</b>

**Note for the External Examiner:**

1. The choice between the questions 1a and 1b shall be done by the external examiner.

**9. Equipment/software list with Specification for a batch of 20 students**

Sl. No.	Particulars	Specification	Quantity
1	MS project/PRIMAVERA	Ver.2010 & above/PRIMAVERA P7 & above	1 licensed/Institute
2	AUTOCAD	Ver.2020	1 licensed/Institute
3	Sketch up/3D MAX	Ver.2018 & above	1 licensed/Institute
4	Computer/Laptop	I5, SSD512 MB, 2GB graphic card	20computer/batch
5	Printer	LaserJet printer	1no/batch





**Government of Karnataka**  
**DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION**

<b>Programme</b>	Civil Engineering	<b>Semester</b>	Fourth Semester
<b>Course Code</b>	20CE44P	<b>Type of Course</b>	Programme Core
<b>Course Name</b>	Design and Detailing RCC Structures	<b>Contact Hours</b>	8 hours/week 104 hours/semester
<b>Teaching Scheme</b>	L:T:P :: 3:1:4	<b>Credits</b>	6
<b>CIE Marks</b>	60	<b>SEE Marks</b>	40

**1. Rationale:** This course is an applied engineering subject. Diploma holders in Civil Engineering will be required to supervise RCC Construction and fabrication. Students may also be required to design simple structural elements, make changes in design depending upon availability of materials This subject thus deals with elementary design principles as per IS: 456.

**2. Course Outcomes/Skill Sets:** At the end of the semester student will be able to,

CO-01	Identify the various structural RCC elements of a building for a given construction project. Explain the concept of Limit state design of Reinforced Cement Concrete (RCC).
CO-02	Explain the difference between the structural behaviour of different reinforced concrete structural elements through demonstration experiments and data analysis.
CO-03	Design, draft and detail different elements of reinforced concrete structural systems subjected to gravity, dead and live loads as per IS codes.
CO-04	Prepare bar bending schedules for different structural elements of buildings as per structural detailed drawing.
CO-05	Fabricate reinforcement for structural elements as per detailed drawing and Barbending schedule.

**NOTE:** Detailing and drafting shall be done in AUTOCAD.

Barbending Schedule and Material calculation shall be done in a spreadsheet.

Prototypes shall be created at the end of each week by each student

Tools used during fabrication of steel shall be taught and safety protocol shall be followed in site/field.

### 3. Course Content

Week	CO	PO	Lecture (Performance Criteria)		Tutorial (Activity Criteria)	Practice
			3 hours/week		1 hour/week	4 hours/week (2 hours/batch twice in a week)
1	1	1	1	Introduction: Concept of reinforced cement concrete structures, Different grades of concrete and steel used in RCC. Load and loading standards as per IS: 875.	1. Study different codal provisions	1 & 2 Demonstrate concept of density, Load and Loading standards for materials
			2	Design Based on Limit State Method: -Fundamentals of Limit State Method, types of limit state.		
			3	Introduction to stress block parameters, Assumptions in the theory of simple bending for RCC beams, Neutral Axis, Moment of resistance.		
2	1	1	1	Critical neutral axis, actual neutral axis. Concept of under reinforced, balanced and over-reinforced sections.	1. Study the Codal provisions for development Length of bars, Side face reinforcement, Nominal Cover to reinforcement.	1 & 2: Demonstrate Failure modes of RCC structural elements with Videos and Photos.
			2	Concept of balanced, under reinforced and over-reinforced sections.		
			3	Partial safety factors, Flexural strength, Shear Strength, Concept of Deflection and cracking, Design requirements.		
3	2, 3,4	2,3	1	Beams: Design Concept of Simply supported and cantilever singly reinforced Beams as per IS 456-2000.	1. Prepare Barbending schedule for singly reinforced simply supported	1 & 2: Detailing and Drafting of Singly Reinforced simply supported beam as per codal provisions.

			2 & 3	Analysis and design of Singly reinforced simply supported beam.	beam using spreadsheet.	
4	2, 3,4	2,3	1	Continuation	1. Prepare Bar bending schedule for singly reinforced cantilever beam using spreadsheet	1 & 2: Detailing and Drafting of Singly Reinforced cantilever beam as per codal provisions
			2 & 3	Analysis and design of singly reinforced cantilever beam		
5	2, 3,4	2,3	1	Beams: Design Concept of Doubly reinforced Simply supported and cantilever Beams as per IS 456-2000	1.Prepare Bar bending schedule for Doubly Reinforced simply supported beam  2.Prepare Bar bending schedule for Doubly Reinforced cantilever beam	1. Detailing and Drafting Doubly Reinforced simply supported beam as per codal provisions.
			2	Analysis & Design of Doubly reinforced simply supported beam		2. Detailing and Drafting of Doubly Reinforced cantilever beam, as per codal provisions.
			3	Analysis & Design of Doubly reinforced cantilever beam		
6	2, 3,4	2,3	1	Design Concept of RCC One way slab.	1.Prepare Bar bending schedule for one way slab  2.Prepare a report on the design of economic section by optimization of materials.	1 & 2: Detailing and drafting of one-way slab as per codal provisions.
			2	Analysis of one-way slab.		
			3	Design of one-way slab.		
7	2, 3,4	2,3	1	Design concept of RCC two-way Slab	1.Prepare Bar bending schedule for two-way slab	1: Detailing and drafting of two-way slab as per codal provisions- Corners are not held down
			2	(iii) Design of Two-way slab: a) Corners are not held down: All the Four edges discontinuous case only.		2: Detailing and drafting of two-way slab as per codal provisions- Corners are held down

			3	(iii) Design of Two-way slab: b) Corners are held down: All the Four edges discontinuous case only.		
8	2,3,4	2,3	1	Design Concept of One-way continuous slab (Two span only) using moment coefficient as per IS: 456.	1.Prepare Bar bending schedule for one-way continuous slab	1. Detailing and Drafting of one-way Continuous slab, as per codal provisions
			2	Design of Two-way continuous slab: All the Four edges continuous case only.	2.Prepare Bar bending schedule for two-way continuous slab	2. Detailing and Drafting of two-way Continuous slab as per codal provisions
			3			
9	2,3,4	2,3	1	Columns: Concept of long and short columns, Specifications for main and lateral reinforcement, interaction diagram in column design, Behaviour of RCC column under axial load.	1.Prepare Bar bending schedule for column (Square and rectangle)	Detailing and Drafting of Axially loaded short columns (square and rectangular as per IS specifications),
			2	Analysis and Design of Axially loaded column		Detailing and drafting of column subjected to uniaxial bending (square and rectangular as per IS specifications)
			3	Design of column subjected to uniaxial bending for reinforcement distributed equally on TWO sides only using SP-16 chart (Square and Rectangular).		
10	2,3,4	2,3	1	Design of Column Footings: Concept of column footing, Design criteria for square, rectangular isolated column footings,	1.Prepare Bar bending schedule for isolated column footing (Square and rectangular)	Detailing and drafting of isolated column footing (square and rectangular) as per IS specification
			2	Design of square, rectangular isolated column footings,		
			3	Continuation		
11	2,3,4	2,3	1	Design of Stairs: Introduction to stairs, Design of dog-legged stairs as per codal provisions.	1.Prepare Bar bending schedule for Stairs.	1.Detailing and Drafting of dog legged stair (with

						waist slab) as per codal provisions
			2	Single flight stairs-Waist slab		2.Detailing and Drafting of Folded/chain stair as per codal provisions.
			3	Design of Folded/Chain link stairs.		
12	2, 3,4	2,3	1	Design of Lintel with chejja: Introduction to lintel with chejja	1.Prepare Bar bending schedule for lintel with chejja	Detailing and drafting of lintel with chejja as per codal provisions
			2	Design of lintel with chejja		
			3	Continuation		
13	5	4	1	Field Practice on bar fabrication for Beam, slab, column, column footing, lintel with chejja and field/site visit		
			2			
			3			
<b>Total in hours</b>				<b>39</b>	<b>13</b>	<b>52</b>

**NOTE 1:** The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits

**NOTE 2:** The TUTORIAL (Activity criteria) shall be conducted / executed by the student (Minimum ONE suggested activity from each week) and to be submitted in portfolio evaluation of activities through rubrics to the faculty.

**NOTE 3:** The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty

#### 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 Skill Test-Practice	6	180	100	Average of two skill test reduced to 20
5	CIE-5 Skill Test-Practice	12	180	100	

6	CIE-6 Portfolio continuous evaluation of Tutorial sessions through Rubrics	1-13		10	10
Total CIE Marks					60
Semester End Examination (Practice)			180	100	40
<b>Total Marks</b>					<b>100</b>

### 5. Format for CIE written Test

Course Name	<b>Design and Detailing RC Structures</b>	Test	I/II/III	Sem	III/IV
Course Code	<b>20CE44P</b>	Duration	80 Min	Marks	30
<b>Note:</b> Answer any one full question from each section. Each full question carries 10 marks.					
Section	Assessment Questions	Cognitive Levels	Course Outcome	Marks	
I	1				
	2				
II	3				
	4				
III	5				
	6				
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, Cognitive level and course outcomes.					

### 6. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score
		2	4	6	8	10	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	8
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	6
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2
Average Marks= (8+6+2+2)/4=4.5							<b>5</b>

**Note:** Dimension and Descriptor shall be defined by the respective course coordinator as per the activities



## 7. Reference:

Sl. No.	Description
1	Design of Reinforced Concrete Structures by S Ramamrutham& R Narayan
2	Reinforced Concrete Structures by B C Punmia
3	SP-16 Design aid for IS 456-2000, SP-23 Handbook on concrete mixes
4	BIS, IS 456 – 2000 Code of Practice for Plain & Reinforced Concrete

## 8. a. CIE Skill Test 1- Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10
2	Simply supported/Cantilever -Singly/Doubly reinforced beam /One way slab. a. Design of given structural element as per codal provision-30 marks b. Detailing and drafting of designed structural Element-30 Marks c. Bar bending Schedule for given structural element using spreadsheet- 20 Marks	80
3	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

## 8. b. CIE Skill Test 2 - Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Portfolio evaluation for practice sessions -Performance criteria (Observations and report)	10

2	Two-way slab/Column with Footing/Staircase a. Design of given structural element as per codal provision -30 marks b. Detailing and drafting of designed structural Element-30 Marks c. Bar bending Schedule for given structural element using spreadsheet - 20 Marks	80
3	Viva-Voce	10
<b>Total Marks</b>		<b>100</b>

### 8. c. SEE- Scheme of Evaluation

SL. No.	Particulars/Dimension	Marks
1	Simply supported/Cantilever -Singly/Doubly reinforced beam /One way slab/Two-way slab/Column with Footing/Staircase/Lintel with Chejja a. Detailing and drafting of structural Element as per the given design data and codal provision-30 Marks b. Bar bending Schedule for given structural element using spreadsheet - 20 Marks c. Fabrication of steel as per Detailing- 30 Marks	80
2	Viva-Voce	20
<b>Total Marks</b>		<b>100</b>

### 9. Equipment/software list with Specification for a batch of 20 students

Sl. No.	Particulars	Specification	Quantity
1	Computer with AutoCAD software	8 GB RAM, 512GB HARD DRIVE, i5 and above 2.5 GHz PROCESSOR	1/ student
2	Bar Bending tools		1 set / batch



**Government of Karnataka  
Department of Collegiate and Technical Education**

<b>Programme</b>	Audit Course	<b>Semester</b>	IV
<b>Course Code</b>	20CE45T	<b>Type of Course</b>	Audit
<b>Course Name</b>	<b>Indian Constitution</b>	<b>Contact Hours</b>	2 hours/week 26 hours/semester
<b>Teaching Scheme</b>	L:T:P :: 2:0:0	<b>Credits</b>	2
<b>CIE Marks</b>	50	<b>SEE Marks</b>	Nil

**1. Course Outcomes:** At the end of the Course, the student will be able to:

CO-01	<b>CO1</b>	Understand Preamble, salient features and importance of Indian Constitution.
CO-02	<b>CO2</b>	Understand Fundamental rights, duties and Directive principles of state policy.
CO-03	<b>CO3</b>	Understand Parliamentary system of governance, Structure, Functions, Power of Central, state governments (Legislative, Executive) and Judiciary.
CO-04	<b>CO4</b>	Understand Panchayat Raj Institutions and Local self-governments, UPSC, KPSC, NHRC, Status of women, RTE etc.

**2. Course Content**

<b>Week</b>	<b>CO</b>	<b>Detailed Course Content</b>	<b>Contact Hours</b>
1	1	Introduction to constitution of India-Formation and Composition of the Constituent Assembly-Salient features of the Constitution-Preamble to the Indian Constitution	2
2	1,2	Fundamental Rights- Definition, The right to equality, The right to freedom, The right against exploitation, The right to freedom of religion.	2
3	1,2	Cultural and educational rights and The right to constitutional remedies. Fundamental Duties, Directive principles of state policy.	2
4	1,3	Parliamentary system of governance- Structure of Parliament- Lok Sabha and Rajya Sabha. Functions of parliament- Legislative, Executive, Financial Function Powers of Lok Sabha and Rajya Sabha.	2
5	1,3	Procedure followed in parliament in making law, Annual financial statement (Budget) – procedure in parliament with respect to estimates, Appropriation bill, Supplementary, additional grants, Vote on account, votes on credit and exception grant, special provisions, rules of procedure.	2
6	1,3	Structure of union executive, Power and position of President. Vice President, Prime minister and council of ministers.	2

7	1,3	Structure of the judiciary: Jurisdiction and functions of Supreme Court, high court, and subordinate courts.	2
8	1,3	Federalism in the Indian constitution- Division of Powers: Union list, State list and concurrent list. Structure of state legislation, Legislative assembly and Legislative council.	2
9	1,3	Functions of state legislature, Structure of state executive-Powers and positions of Governor, Speaker, Deputy Speaker, Chief Minister and council of minister.	2
10	4	Local self-government- meaning-Three tier system, Village Panchayat-Taluk panchayat Zilla panchayat, Local bodies-Municipalities and Corporations, Bruhath Mahanagara Palike, Functions of Election commission, UPSC, KPSC.	2
11	4	Amendment of the constitution, Human Rights-Definition-constitutional provisions-right to life and liberty-Human Rights of Women-Discrimination against women steps that are to be taken to eliminate discrimination against women in Education, employment, health care, Economic and social life,	2
12	4	Status of Women in India - Women in rural areas, Constitutional Safeguards - Dowry Prohibition act 1961- Domestic violence act 2005- Sexual harassment at work place bill 2006. Human Rights of Children- Who is a child- list the Rights of the Child- Right to education, Protection of Children from Sexual Offences Act (POCSO)-2012-	2
13	1,4	National Human Rights Commission Constitution- Powers and function of the Commission-Employee rights- Provisions made, Contractual-Non contractual employee rights-Whistle blowing-definition-Aspects-Intellectual Property Rights (IPR)-Meaning-Need for protection- Briefly description of concept of patents, Copy right, Trademark	2
<b>Total in Hours</b>			<b>26 Hrs</b>

## REFERENCES

1. Introduction to the Constitution of India- Dr. Durga Das Basu
2. Empowerment of rural women in India-Hemalatha H.M and Rameshwari Varma, Hema Prakashana.

## 4. CIE and SEE Assessment Methodologies

Sl. No	Assessment	Test Week	Duration In minutes	Max marks	Conversion
1.	CIE-1 Written Test	5	80	30	Average of three tests 30
2.	CIE-2 Written Test	9	80	30	
3	CIE-3 Written Test	13	80	30	
4.	CIE-4 MCQ	6	60	20	Average of two CIE = 20
5	CIE-5 Open Book Test	12	60	20	
Total CIE Marks					50
Semester End Examination (Practice)			-	-	-
<b>Total Marks</b>					<b>50</b>

