II Semester Scheme of Studies - Diploma in Civil Engineering [C-20]

Sl No	Course Category / Teaching Department	Course Code	Course Title	Hours per week			Total contact hrs/week	Credits	CIE Marks		SEE Marks		Total Marks	Min Marks for Passing (including CIE)	Assigned Grade	Grade Point	SGPA and CGPA
				L	T	P			Max	Min	Max	Min					
THEORY COURSES																	
1	BS/SC	20SC01T	Engineering Mathematics	4	0	0	4	4	50	20	50	20	100	40			
2	SC/CE	20PM01T	Project Management Skills	6	0	0	6	4	50	20	50	20	100	40			
PRACTICAL COURSES																	
3	ES/CE	20CE21P	Civil Engineering Graphics	2	0	4	6	4	60	24	40	16	100	40			
4	ES/CE	20CE22P	Basic Surveying	2	0	4	6	4	60	24	40	16	100	40			
5	ES/EE	20EE01P	Fundamentals of Electrical & Electronics Engineering	2	0	4	6	4	60	24	40	16	100	40			
AUDIT COURSES																	
6	AU/CE	20KA21T	Kannada-I/ಸಾಹಿತ್ಯಸಿಂಚನ – I /ಬಳಕೆ ಕನ್ನಡ - I	2	0	0	2	2	50	20	-	-	50	20			
			Total	18	0	12	30	22	330	132	220	88	550	220			

SGPA & CGPA of 2nd Semester

T:- Theory   P:- Practical D:- Drawing E:- Elective BS- Basic Science:: ES-Engineering Science:: HS-Humanities & Social Science:: AU-Audit Course:: EG: English ::SC: Science

Note:
1. Assigned Grade, Grade Point, SGPA and CGPA to be recorded in the Grade/Marks card.
2. Theory course Semester End Examination (SEE) is conducted for 100 marks (3 Hours duration)
3. Practical course CIE and SEE is conducted for 100 marks (3 Hours duration)

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Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

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Course Code	20SC01T	Semester	I/II
Course Title	**ENGINEERING MATHEMATICS**	Course Group	Core
No. of Credits	4	Type of Course	Lecture
Course Category	Theory	Total Contact Hours	4Hrs Per Week
			52Hrs Per Semester
Prerequisites	10 Level Mathematics	Teaching Scheme	(L:T:P) = 4:0:0
CIE Marks	50	SEE Marks	50

RATIONALE

Engineering Mathematics specification provides students with access to important mathematical ideas to develop the mathematical knowledge and skills that they will draw on in their personal and work lives. The course enable students to develop mathematical conceptualization, inquiry, reasoning, and communication skills and the ability to use mathematics to formulate and solve problems in everyday life, as well as in mathematical contexts. At this level, the mathematics curriculum further integrates the three content areas taught in the higher grades into three main learning areas: Algebra; Measurement of angles and Trigonometry and Calculus.

1. COURSE SKILL SET

Student will be able to:

1. Solve system of linear equations arise in different engineering fields
2. Incorporate the knowledge of calculus to support their concurrent and subsequent engineering studies
3. Adept at solving quantitative problems
4. Ability to understand both concrete and abstract problems
5. Proficient in communicating mathematical ideas
6. Detail-oriented

2. COURSE OUT COMES

At the end of the course, student will be able to

CO1	Determine the inverse of a square matrix using matrix algebra. Apply the concepts of matrices and determinants to solve system of linear equations and find eigen values associated with the square matrix.
CO2	Find the equation of straight line in different forms. Determine the parallelism and perpendicularity of lines.
CO3	Calculate trigonometric ratios of allied angles and compound angles. Transform sum or difference of trigonometric ratios into product and vice versa.

CO4	Differentiate various continuous functions and apply the concept in real life situations.
CO5	Integrate various continuous functions and apply the concept in evaluating the area and volume through definite integrals.

3. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS

UNIT NO	UNIT TITLE	TEACHING HOURS	DISTRIBUTION(THEORY)			
			R LEVEL	U LEVEL	A LEVEL	TOTAL
1	Matrices and Determinants	10	8	20	12	40
2	Straight lines	10	8	20	12	40
3	Trigonometry	10	8	20	12	40
4	Differential Calculus and applications	11	8	20	12	40
5	Integral Calculus and applications	11	8	20	12	40
	Total	52	40	100	60	**200**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

4. DETAILS OF COURSE CONTENT

The following topics/subtopics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets.

UNIT NO	Unit skill set (In cognitive domain)	Topics/Subtopics	Hours L-T-P
UNIT-1 MATRICES AND DETERMINANTS	➢ Use algebraic skills which are essential for the study of systems of linear equations, matrix algebra and eigen values	1.1 Matrix and types 1.2 Algebra of Matrices (addition, subtraction, scalar multiplication and multiplication) 1.3 Evaluation of determinants of a square matrix of order 2 and 3. Singular matrices 1.4 Cramer's rule for solving system of linear equations involving 2 and 3 variables 1.5 Adjoint and Inverse of the non-singular matrices of order 2 and 3 1.6 Characteristic equation and Eigen values of a square matrix of order 2	10-0-0

UNIT-2 STRAIGHT LINES	➢ Able to find the equation of a straight line in different forms ➢ Determine whether the lines are parallel or perpendicular	2.1 Slope of a straight line 2.2 Intercepts of a straight line 2.3 Intercept form of a straight line 2.4 Slope-intercept form of a straight line 2.5 Slope-point form of a straight line 2.6 Two-point form of a straight line 2.7 General form of a straight line 2.8 Angle between two lines and conditions for lines to be parallel and perpendicular 2.9 Equation of a straight line parallel to the given line 2.10 Equation of a straight line perpendicular to the given line	10-0-0
UNIT-3 TRIGONOMETRY	➢ Use basic trigonometric skills in finding the trigonometric ratios of allied and compound angles ➢ Able to find all the measurable dimensions of a triangle	3.1 Concept of angles, their measurement, Radian measure and related conversions. 3.2 Signs of trigonometric ratios in different quadrants (ASTC rule) 3.3 Trigonometric ratios of allied angles (definition and the table of trigonometric ratios of standard allied angles say $90^0 \pm \Theta$, $180^0 \pm \Theta$, $270^0 \pm \Theta$ and $360^0 \pm \Theta$) 3.4 Trigonometric ratios of compound angles (without proof) 3.5 Trigonometric ratios of multiple angles 3.6 Transformation formulae	10-0-0
UNIT-4 DIFFERENTIAL CALCULUS AND APPLICATIONS	➢ Able to differentiate algebraic, exponential, trigonometric, logarithmic and composite functions ➢ Able to find higher order derivatives ➢ Understand and work with derivatives as rates of change in mathematical models ➢ Find local maxima and minima of a function	4.1 Derivatives of continuous functions in an interval (List of formulae) 4.2 Rules of differentiation 4.3 Successive differentiation (up to second order) 4.4 Applications of differentiation	11-0-0
UNIT-5 INTEGRAL CALCULUS AND APPLICATIONS	➢ Understand the basic rules of integration and Evaluate integrals with basic integrands. ➢ Identify the methods to evaluate integrands ➢ Apply the skills to evaluate integrals representing areas and volumes	5.1 List of standard integrals and Basic rules of integration 5.2 Evaluation of integrals of simple function and their combination 5.3 Methods of integration 5.4 Concept of definite integrals 5.5 Applications of definite integrals	11-0-0

5. MAPPING OF CO WITH PO

CO	Course Outcome	PO Mapped	UNIT Linked	CL R/U/A	Theory in Hrs	TOTAL
CO1	Determine the inverse of a square matrix using matrix algebra. Apply the concepts of matrices and determinants to solve system of linear equations and find eigen values associated with the square matrix.	1, 7	1	R/U/A	10	**40**
CO2	Find the equation of straight line in different forms. Determine the parallelism and perpendicularity of lines.	1, 7	2	R/U/A	10	**40**
CO3	Calculate trigonometric ratios of allied angles and compound angles. Transform sum (difference) of trigonometric ratios into product and vice versa.	1, 7	3	R/U/A	10	**40**
CO4	Differentiate various continuous functions and apply the concept in real life situations.	1, 3, 7	4	R/U/A	11	**40**
CO5	Integrate various continuous functions and apply the concept in evaluating the area and volume through definite integrals.	1, 3, 7	5	R/U/A	11	**40**
					52	**200**

Course	CO's	Programme Outcomes (PO's)						
		1	**2**	**3**	**4**	**5**	**6**	**7**
ENGINEERING MATHEMATICS	CO1	3	1	0	0	0	0	3
	CO2	3	1	0	0	0	0	3
	CO3	3	1	0	0	0	0	3
	CO4	3	1	3	0	0	0	3
	CO5	3	1	3	0	0	0	3
Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped								

7. INSTRUCTIONAL STRATEGY

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes

1. Explicit instruction will be provided in intervention classes or by using different differentiation strategies in the main classroom.
2. Lecturer method (L) does not mean only traditional lecture method, but different type of teaching method and media that are employed to develop the outcomes.
3. Observing the way their more proficient peers use prior knowledge to solve current challenges and persevere in problem solving will help struggling students to improve their approach to engaging with rich contextual problems.
4. Ten minutes a day in homeroom, at the end of class, or as a station in a series of math activities will help students build speed and confidence.
5. Topics will be introduced in a multiple representation.
6. The teacher is able to show different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
7. In a perfect world, teacher would always be able to demonstrate how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. When a concept cannot be applied in that manner, we can still share how it might be applied within mathematics.

8. SUGGESTED LEARNING RESOURCES:

Sl. No.	Author	Title of Books	Publication/Year
1	B.S. Grewal	Higher Engineering Mathematics	Khanna Publishers, New Delhi, 40th Edition,2007
2	G. B. Thomas, R. L. Finney	Calculus and Analytic Geometry	Addison Wesley, 9th Edition, 1995
3	S.S. Sabharwal, Sunita Jain, Eagle Parkashan	Applied Mathematics, Vol. I & II	Jalandhar.
4	Comprehensive Mathematics	Comprehensive Mathematics Vol. I & II	Laxmi Publications, Delhi
5	ReenaGarg &Chandrika Prasad	Advanced Engineering Mathematics	Khanna Publishing House, New Delhi

9. COURSE ASSESSMENT AND EVALUATION CHART

Sl.No.	Assessment	Duration	Max marks	Conversion
1	CIE Assessment 1 (Written Test -1) At the end of 3 d week	80 minutes	30	Average of three written tests 30
2	CIE Assessment 2 (Written Test -2) At the end of 7 week	80 minutes	30	
3	CIE Assessment 3 (Written Test -3) At the end of 13 week	80 minutes	30	
4	CIE Assessment 4 (MCQ/Quiz) At the end of 5 week	60 minutes	20	Average of three 20
5	CIE Assessment 5 (Open book Test) At the end of 9 week	60 minutes	20	
6	CIE Assessment 6 (Student activity/Assignment) At the end of 11 week	60 minutes	20	
Total Continuous Internal Evaluation (CIE) Assessment				**50**
8	Semester End Examination (SEE) Assessment (Written Test)	3 Hours	100	**50**
Total Marks				**100**

Note:

1. SEE (Semester End Examination) is conducted for 100 Marks theory courses for a time duration of 3 Hours.

2. Three CIE (written test), each of 30 marks for a time duration of 80 minutes shall be conducted. Also, three CIE (MCQ or Quiz/Open book test/student activity or assignment) each of 20 marks for the time duration of 60 minutes shall be conducted. Any fraction at any stage during evaluation will be rounded off to the next higher digit

3. Assessment of assignment and student activity is evaluated through appropriate rubrics by the respective course coordinator. The secured mark in each case is rounded off to the next higher digit.

10 DETAILED COURSE CONTENT

UNIT NO AND NAME	DETAILED COURSE CONTENT	CO	PO	CONTACT HRS	TOTAL
1 **MATRICES AND DETERMINANTS**	Definition and types of matrices	1	1,7	1	10
	Algebra of Matrices (addition, subtraction and scalar multiplication) problems	1	1,7	1	
	Multiplication of Matrices(problems)	1	1,7	1	
	Evaluation of 2x2 ,3x3 determinants and Singular matrices and problems in finding unknown variable	1	1,7	1	
	Cramer's rule to solve system of linear equation with 2 and 3 variables	1	1,7	1	
	Cramer's rule to solve system of linear equation with 2 and 3 variables.problems	1	1,7	1	
	Minors, Cofactors of elements of square matrices of order 2 and 3	1	1,7	1	
	Adjoint of a square matrix(2x2 and 3x3),Inverse of a non singular square matrix	1	1,7	1	
	Adjoint of a square matrix(2x2 and 3x3),Inverse of a non singular square matrix and problems	1	1,7	1	
	Characteristic equation and eigen values of a 2x2 matirx and problems	1	1,7	1	
2 **STRAIGHTLINES**	Slope of the straight line(provided with inclination and two points on the line as well) and problems	2	1,7	1	10
	Intercepts of a straight line and problems	2	1,7	1	
	Intercept form of a straight line and problems	2	1,7	1	
	Slope-intercept form of a straight line and problems	2	1,7	1	
	Slope-point form of the straight line and problems	2	1,7	1	
	Two-point form of a straight line and problems	2	1,7	1	
	General form of a straight line.problems on finding slope and intercepts.	2	1,7	1	
	Angle between two straight lines and conditions for the lines to be parallel and perpendicular and problems	2	1,7	1	
	Equation of a line parellel to the given line and problems	2	1,7	1	
	Equation of a line perpendicular to the given line.problems	2	1,7	1	

3 **TRIGONOMETRY**	Concept of angles and their measurement. Radian measures and related conversions (degree to radian and vice-versa) and problems	3	**1,7**	**1**	**10**
	Signs of trigonometric ratios in different quadrants (ASTC rule)	3	**1,7**	**1**	
	Trigonometric ratios of allied angles (definition and the table of trigonometric ratios of standard allied angles say $90^0\pm\theta$, $180^0\pm\theta$, $270^0\pm\theta$ and $360^0\pm\theta$)	3	**1,7**	**1**	
	Problems on allied angles. (proving identities)	3	**1,7**	**1**	
	Problems on allied angles. (Finding values of x in an identity)	3	**1,7**	**1**	
	Trigonometric ratios of compound angles (without proof)	3	**1,7**	**1**	
	Trigonometric ratios of multiple angles (sin2A, cos2A, tan2A, sin3A, cos3A and tan3A)	3	**1,7**	**1**	
	Problems on multiple angles sin2A, cos2A, tan2A, sin3A, cos3A and tan3A	3	**1,7**	**1**	
	Transformation formulae (without proof) as sum to product. (Simple problems)	3	**1,7**	**1**	
	Transformation formulae (without proof) as product to sum. (Simple problems)	3	**1,7**	**1**	
4 **DIFFERENTIAL CALCULUS AND APPLICATIONS**	Definition of a derivative of a function. Listing the derivatives of standard functions. (Algebraic, trigonometric, exponential, logarithmic and inverse trigonometric functions)	4	**1,3,7**	**1**	**11**
	Addition and subtraction rule of differentiation and problems	4	**1,3,7**	**1**	
	Product rule and quotient rule of differentiation and problems	4	**1,3,7**	**1**	
	Product rule and quotient rule of differentiation and problems	4	**1,3,7**	**1**	
	Composite functions and their derivatives. (CHAIN RULE)	4	**1,3,7**	**1**	
	Composite functions and their derivatives. (CHAIN RULE). Problems	4	**1,3,7**	**1**	
	Successive differentiation up to second order	4	**1,3,7**	**1**	
	Slope of the tangent and normal to the given curve and their equations and problems	4	**1,3,7**	**1**	

		Rate measure: velocity and acceleration at a point of time and problems	4	**1,3,7**	**1**	
		Local Maxima and Minima of a function	4	**1,3,7**	**1**	
		Local Maxima and Minima of a function. Problems	4	**1,3,7**	**1**	
5	**INTEGRAL CALCULUS AND APPLICATIONS**	Definition of an indefinite integral. Listing the Integrals of standard functions. (Algebraic, trigonometric, exponential, logarithmic and inverse trigonometric functions)	5	**1,3,7**	**1**	11
		Rules of Integration. Evaluation of integrals with simple integrands and their combinations	5	**1,3,7**	**1**	
		Rules of Integration. Evaluation of integrals with simple integrands and their combinations. Problems	5	**1,3,7**	**1**	
		Evaluation of integrals with simple integrands and their combinations. Problems	5	**1,3,7**	**1**	
		Evaluation of integrals by Substitution method	5	**1,3,7**	**1**	
		Evaluation of integrals by Integration by parts	5	**1,3,7**	**1**	
		Evaluation of integrals by Integration by parts. Problems	5	**1,3,7**	**1**	
		Definition of definite integrals and their evaluation	5	**1,3,7**	**1**	
		Evaluation of Definite integrals. Problems	5	**1,3,7**	**1**	
		Area enclosed by the curves by integral method	5	**1,3,7**	**1**	
		Volume generated by the curve rotated about an axis by integral method	5	**1,3,7**	**1**	

First Semester Examination, Model Question Paper – 2020
Engineering Mathematics

Duration: 3Hours]   **Subject Code: 20SC01T**   **[Max. Marks:100**

Instruction: Answer one full question from each section. One full question carries 20 marks.

SECTION – 1

1

a If the matrix $\begin{bmatrix} 2 & 4 & 6 \\ 2 & x & 2 \\ 6 & 8 & 14 \end{bmatrix}$ is singular then find x .   **4**

b Find the A^2 for the matrix $\begin{bmatrix} 1 & 3 & 4 \\ -1 & 2 & 1 \\ 0 & 3 & 3 \end{bmatrix}$.   **5**

c Solve $2x - y = 3$ and $x + 2y = 4$ by using determinant method.   **5**

d Find the inverse ofthe matrix $\begin{bmatrix} 2 & 3 & 1 \\ -1 & 2 & 1 \\ 5 & 4 & 3 \end{bmatrix}$.   **6**

2

a If $A = \begin{bmatrix} 2 & -1 \\ 4 & 0 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -3 & 4 \\ -1 & -1 & 1 \\ 0 & 4 & 2 \end{bmatrix}$ then find $(AB)^T$.   **4**

b Verify whether AB=BA for the matrices $A = \begin{bmatrix} 1 & 0 & 5 \\ -1 & 2 & 1 \\ 5 & 4 & 3 \end{bmatrix}$ and

$B = \begin{bmatrix} 3 & -1 & 4 \\ 0 & -1 & 1 \\ 2 & 4 & -2 \end{bmatrix}$.   **5**

c Find the Adjoint of the matrix $A = \begin{bmatrix} 1 & 3 & 4 \\ -1 & 2 & 1 \\ 0 & 3 & 3 \end{bmatrix}$.   **5**

d Find the charcteristic equation and eigen values for the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix}$.   **6**

SECTION – 2

3

a If the straight line is passing through the points (1, 2) and (3, 5) then find the slope of the line. **4**

b Write the standard intercept form of the straight line and hence find the equation of the straight line whose x and y intercepts are 2 and 3 respectively. **5**

c Write the standard slope-intercept form of a straight line. Find the equation of the straight line passing through the point (3, 5) and slope 4 units. **5**

d Find the equation of the straight line parallel to the line passing through the points (1, 3) and (4, 6). **6**

4

a i) If a line inclined at $45°$ with x-axis find its slope.   ii) Write the x and y intercept of the line 2x+3y=10. **2+2**

b Find the equation of the straight line whose angle of inclination is 45^0 and passingthrough the origin. **5**

c Find the equation of the straight line perpendicular to the line 2x+6y=3 and with the y intercept 2 units. **5**

d Find the acute angle between the lines 7x-4y=0 and 3x-11y +5=0. **6**

SECTION – 3

5 **a** Express $75°$ in radian measure and $3\pi/2$ in degree. **4**

b Prove that $\cos(A + B)\cos(A - B) = \cos^2 A - \sin^2 B$. **5**

c Show that $\cos 2\theta = 2\cos^2 \theta - 1$. **5**

d Find the value of $\sin 120° \cdot \cos 330° - \sin 240° \cdot \cos 390°$ without using calculator. **6**

6 **a** Find the value of $\sin 15°$. **4**

b   Simplify $\dfrac{\cos(360° - A)\tan(360° + A)}{\cot(270° - A)\sin(90° + A)}$.   5

c   Prove that $\sin 3\theta = \sin 3\theta - 4\sin^3 \theta$.   5

d   Prove that $\sin 20° \cdot \sin 40° \cdot \sin 80° = \dfrac{\sqrt{3}}{8}$.   6

SECTION – 4

7

a   Find the derivative of $y = x^2 + e^{2x} + \cos 2x - 2\log x$ with respect to x.   4

b   Find dy/dx of $y = \dfrac{\sec x + \tan x}{\sec x - \tan x}$.   5

c   Find dy/dx of $y = \tan^{-1}\left(\dfrac{1+x}{1-x}\right)$.   5

d   If the $s = 2x^3 + 3x + 4$ repersents the displacement of the particle in motion at time x, then find the velocity of the particle at $x = 2$ secs and acceleration at $x = 3$ secs.   6

8

a   Find $\dfrac{dy}{dx}$ of $y = 3x^4 + 4\log x + 2e^{3x} + \tan^{-1} x$.   4

b   If $y = e^{2x} \sin 3x$ then find $\dfrac{dy}{dx}$.   5

c   Find $\dfrac{d^2 y}{dx^2}$ if $y = 3\sin x + 4\cos x$ at $x = 1$.   5

d   Find the equation of tangent and normal to the curve $y = x^2$ at the point (1, 1).   6

SECTION – 5

9   **a**   Evaluate $\int (x-1)(x+1)dx$.   4

b   Evaluate $\int_{0}^{\pi/2} \sin^2 x \; dx$ **5**

c   Evaluate $\int x \sin x \, dx$.   **5**

d   Find the area bounded by the curve $y = 4x - x^2 - 3$, x-axis and ordinates   **6**

$x = 1$ and $x = 3$.

10

a   Evaluate $\int_{0}^{2} e^x dx$.   **4**

b   Evaluate $\int \dfrac{4\cos(\log x)}{x} dx$.   **5**

c   Evaluate $\int x e^x \; dx$.   **5**

d   Find the volume of the solid generated by revolving the curve $y = \sqrt{x^2 + 5x}$ **6**

between $x = 1$ and $x = 2$.

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Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

Course Code	20PM01T	Semester	II
Course Title	**Project Management Skills**	Course Group	PM
No. of Credits	4	Type of Course	Activity based study
Course Category	Theory with Activities	Total Contact Hours	6 Hrs Per Week (2Theory +4 hrs of classroom activities)
			78 Hrs Per Semester
Prerequisites	10ᵗʰLevel Mathematics	Teaching Scheme	4 hrs per week classroom sessions dedicated to case studies & activities
CIE Marks	50	SEE Marks	50

RATIONALE

Project Management is a confluence of Management principles and Engineering subject area. This course enables the students to develop conceptualisation of Engineering Management principles and apply the same for their engineering projects, in their domains, example, Software Development project or Construction Project and so on. The course integrates three core areas of Planning, Execution and Auditing of Projects.

1. COURSE SKILL SET

Student will be able to:

1. Understand what constitutes a project, Plan for the execution of the project by breaking into manageable work units, and Prepare necessary project artefacts
2. Track and control the Project while preparing verifiable records for Project Inspections and Audits
3. Inspect and Audit projects for Milestones or other project completion criteria and other metrics, Defects and remediation, Project learning
4. Gain knowledge and develop curiosity on latest technology trends in Project management

2. COURSE OUT COMES

At the end of the course, student will be able to

CO1	Apply the concepts of Project Management to real projects which are expressed in the form of the Project reports or Engineering drawings
CO2	Estimate Project resources needed Time, Material and Effort, and Plan for execution
CO3	Understand, analyse and assess the risks involved in a project and plan for managing them
CO4	Use Project Management Software and processes to track and control Projects
CO5	Conduct inspection of Projects and audit progress and bills
CO6	Understand the Digital Technology trends in Project management and concepts like Smart cities

3. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS

UNIT NO	UNIT TITLE	TEACHING HOURS (L-T-P)	MARKS DISTRIBUTION(THEORY)			
			R LEVEL	U LEVEL	A LEVEL	TOTAL
1	Introduction	02-00-04	8	8	4	20
2	Project Administration	06-00-12	8	12	20	40
3	Project Lifecycle	04-00-08	8	12	20	40
4	Project Planning, Scheduling and Monitoring	06-00-12	8	12	20	40
5	Project Control, Review and Audit	06-00-12	8	12	20	40
6	Digital Project Management	02-00-04	8	8	4	20
	Total	26-00-52=78	**48**	**64**	**88**	**200**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

4. DETAILS OF COURSE CONTENT

The following topics/subtopics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets.

UNIT NO	Unit skill set (In cognitive domain)	Topics / Subtopics	Hours L-T-P
1 Introduction	Use Basic Science, Maths skills to understand Project management and project planning, execution and control.	Introduction and definition, Features of a Project, Types of Projects, Benefits and Obstacles in Project Management, Project Management Profession, Role of Project manager, Consultants, Project and Operation, Project Management Process, Project Scope	02-00-04
2 Project Administration	Able to develop WBS, PEP and PM processes for Project with given inputs	Project Administration, Project Team, Project Design, Work Breakdown Structure (WBS), Project Execution Plan (PEP), Systems and Procedure Plan, Project Direction, Communication and Co-ordination, Project Success Case Study I	06-00-12
3 Project Lifecycle	Use project administration and project lifecycle knowledge to Assess and plan for project risk	Project Life Cycle, Phases - Project Planning, Project Execution, Project Closure, Project Risks, Project Cost Risk Analysis, Time and Cost overruns Case Study 2a	04-00-08
4. Project Planning, Project Scheduling and Project Monitoring and Implementation	Able to develop a detailed project plan given the inputs on manpower, funds availability and time availability	Project Planning Function, Structure, Project Scheduling, Project monitoring and Project evaluation Case Study 2b	06-00-12
5.Project Control, Review and Audit	Use Project Management lifecycle knowledge to Control project parameters, review and audit project performance	Project Control, Problems of Project Control, Gantt Charts, Milestone Charts, Critical Path Method (CPM), Network Technique in Project Scheduling, Crashing Project Duration through Network, Project Review, Initial Review, Performance Evaluation,	06-00-12

		Abandonment Analysis, Project Audit	
		Case Study 2c	
6.Digital Project Management	Understand latest trends of digital technologies impacting the domain of project management and application of the same in multiple scenario	Digital Technology trends in Project management, Cloud Technology, IoT, Smart cities, Data and analytics, case studies Case study 3	02-00-04

1. **MAPPING OF CO WITH PO**

CO	Course Outcome	PO Mapped	UNIT Linked	CL R/U/A	Sessions in Hrs	TOTAL - Marks
CO1	Understand the concepts of Project Management in relation to real projects which are expressed in the form of the Project reports or Engineering drawings Case Study - I	1, 2, 5, 7	1, 2	R/U/A	06	10
CO2	Estimate Project resources needed Time, Material and Effort, and Plan for execution Case study 2a	1, 2, 3, 7	2, 3	R/U/A	18	20
CO3	Evaluate the risks involved in a project and Plan for managing them Case Study - 2a	1,2,3,7	2,3	R/U/A	12	20
CO4	Use Project Management methods with Software and/or processes to track and control Projects Case Study 2b	1, 4, 6, 7	4	R/U/A	18	20

CO5	Conduct inspection of Projects and audit progress and bills Case Study 2c	**1, 2, 5, 7**	5	**R/U/A**	18	20
CO6	Understand the Digital Technology trends in Project management, and Engineering Industries Case Study 3	**1, 5, 7**	6	**R/U/A**	06	**10**
					78	**100**

	CO's	**Programme Outcomes s) (PO**
		1	**2**	**3**	**4**	**5**	**6**	**7**
Project Management	CO1	3	3	0	0	2	0	1
	CO2	3	3	3	0	0	0	1
	CO3	3	0	0	3	0	3	1
	CO4	3	0	0	3	0	3	1
	CO5	3	2	0	0	2	0	1
	CO6	3	0	0	0	2	0	2

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped

7. INSTRUCTIONAL STRATEGY

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes

1. Explicit instruction will be provided in intervention classes or by using different differentiation strategies in the main classroom.
2. Lecturer method (L) does not mean only traditional lecture method, but different type of teaching method and media that are employed to develop the outcomes.
3. Observing the way their more proficient peers use prior knowledge to solve current challenges and persevere in problem solving will help struggling students to improve their approach to engaging with rich contextual problems.
4. Topics be introduced always with a reallife example and then answering What, how, why and when.
5. The teacher is able to show different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
6. In a perfect world, teacher would always be able to demonstrate how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. When a concept cannot be applied in that manner, we can still share how it might be applied within mathematics.

8. SUGGESTED LEARNING RESOURCES:

SlNo.	Author	Title of Books	Publication/Year
1	**Dr. Lalitha Balakrishnan & Dr. Gowri Ramachandran**	**Project Management**	**Himalaya Publishing, 2019**
2	Shailesh Kumar Shivakumar	Complete Guide to Digital Project Management	Apress, 2019
3	Prasanna Chandra	Project planning, analysis, selection, implementation and review	Tata McGraw Hill
4	Gopala Krishnan	Project Management	Mcmillan India Ltd.

9. COURSE ASSESSMENT AND EVALUATION CHART

Sl.No	Assessment	Duration	Max marks	Conversion
1	CIE Assessment 1 (Written Test -1) At the end of 3rd week	80 minutes	30	Average of three written tests 30
2	CIE Assessment 2 (Written Test -2) At the end of 7th week	80 minutes	30	
3	CIE Assessment 3 (Written Test -3) At the end of 13th week	80 minutes	30	
4	CIE Assessment 4 (Group Assignment -1) At the end of 5th week	60 minutes	20	Average of three 20
5	CIE Assessment 5 (Group Assignment -2) At the end of 9th week	60 minutes	20	
6	CIE Assessment 6 (Individual Student activity/Assignment) At the end of 11th week	60 minutes	20	
	Total Continuous Internal Evaluation (CIE) Assessment			**50**
8	Semester End Examination (SEE) Assessment (Written Test)	3 Hrs	100	**50**
	Total Marks			**100**

Note:

3. SEE (Semester End Examination) is conducted for 100 Marks theory course for a time duration of 3 Hrs

4. Three CIE (written test), each of 30 marks for a time duration of 80 minutes shall be conducted. Also, three CIE (MCQ or Quiz/Group Assignment/Individual student activity or assignment) each of 20 marks for the time duration of 60 minutes shall be conducted. Any fraction at any stage during evaluation will be rounded off to the next higher digit

5. Assessment of assignment and student activity is evaluated through appropriate rubrics by the respective course coordinator. The secured mark in each case is rounded off to the next higher digit.

10 DETAILED COURSE CONTENT

Unit No And Name	DETAILED COURSE CONTENT	CONTACT HRS	TOTAL
1. Introduction	1.1 Introduction	3	6
	1.2 Meaning of Project		
	1.3 Definition and No Change Mode		
	1.4 Features of a Project		
	1.5 Types of Projects		
	1.6 Benefits of Project Management		
	1.7 Obstacles in Project Management		
	1.8 Project Management A Profession		
	1.9 Project Manager and His Role		
	1.10 Project Consultants		
	1.11 What is Operation?	**3**	
	1.12 Difference between Project and Operation		
	1.13 What is Process in Project Management and Process Groups?		
	1.14 What is Scope? Difference between Project Group Objectives and		
	1.15 Project Scope		
2. Project Administration	2.1 Essentials of Project Administration	3	**18**
	2.2 Project Team		
	2.3 Project Design		
	2.4 Work Breakdown Structure (WBS)		

	2.5 Project Execution Plan (PEP)	6	
	2.6 Contracting Plan		
	2.7 Work Packing Plan		
	2.8 Organisation Plan	3	
	2.9 Systems and Procedure Plan		
	2.10 Project Procedure Manual		
	2.11 Project Diary	**3**	
	2.12 Project Execution System		
	2.13 Project Direction		
	2.14 Communication in a Project	**3**	
	2.15 Project Co-ordination		
	2.16 Pre-requisites for Successful Project Implementation		
3. Project Lifecycle	3.1 Introduction	6	12
	3.2 Phases of Project Life Cycle		
	3.3 Project Management Life Cycle General		
	3.4 Project Planning		
	3.5 Project Execution		
	3.6 Project Closure		
	3.7 Project Risks	3	
	3.8 Types of Risks: Illustrations		
	3.9 Risk Assessment Techniques with Illustrations		
	3.10 Project Cost Risk Analysis	**3**	
	3.11 Estimating Time and Cost Overrun Risks		
	3.12 Organisation/Procedural/Systemic Reasons for Project Cost Overruns		
	3.13 Time Overruns		
4. Project Planning, Scheduling and Monitoring	4.1 Introduction	6	**18**
	4.2 Nature of Project Planning		
	4.3 Need for Project Planning		
	4.4 Functions of Project Planning		
	4.5 Steps in Project Planning		
	4.6 Project Planning Structure		
	4.7 Project Objectives and Policies		
	4.8 Tools of Project Planning		

	4.9 Project Scheduling	**6**	
	4.10 Time Monitoring Efforts		
	4.11 Bounding Schedules		
	4.12 Scheduling to Match Availability of Manpower		
	4.13 Scheduling to Match Release of Funds		
	4.14 Problems in Scheduling Real-life Projects		
	4.15 Introduction	**3**	
	4.16 Situation Analysis and Problem Definition		
	4.17 Setting Goals and Objectives		
	4.18 Generating Structures and Strategies		
	4.19 Implementation		
	4.20 What is Project Evaluation?	**3**	
	4.21 Why is Project Evaluation Important?		
	4.22 What are the Challenges in Monitoring and Evaluation?		
5. Project Control, Review and Audit	5.1 Introduction	6	**18**
	5.2 Projected Control Purposes		
	5.3 Problems of Project Control		
	5.4 Gantt Charts		
	5.5 Milestone Charts		
	5.6 Critical Path Method (CPM)	6	
	5.7 Construction of a Network		
	5.8 Network Technique in Project Scheduling		
	5.9 Crashing Project Duration through Network		
	5.10 Project Review	3	
	5.11 Initial Review		
	5.12 Post Audit		
	5.13 Performance Evaluation		
	5.14 Abandonment Analysis		
	5.15 Objectives of Project Audit	**3**	
	5.16 Functions of Project Auditor		

	5.17 Project Audit Programme		
	5.18 Difficulties in Establishing Audit Purpose and Scope		
6. Digital Project Management	6.1 Digital Technology trends in Project management	**1**	6
	6.2 Cloud Technology, IoT, AR and VR applications in Project management, Smart Cities	**1**	
	6.3 Data Science and Analytics in Project Management	**1**	
	6.4 Case Studies	3	

Case Studies:

Please note: The Tutors can either use the following Case studies and activities or Design on their own, with the overall Learning Outcomes being met.

Case Study I: Residential House – Project Execution Plan

1. Dr. Sunil Kulkarni wants to build a house on his 9000 square feet (90x100) vacant plot in Bengaluru. His requirements were given below.

   i)   He lives with his wife, parents and two college going children.
   ii)   He likes open space around his house and likes to do gardening during free time
   iii)   His wife teaches Yoga and about 30 middle aged and old people attend the daily sessions.
   iv)   He has a budget limitation of INR 230,00,000 for this project and wants to present to his wife on their 20th wedding anniversary which is 18 months away.
   v)   His parents can not climb stairs and hence prefer a ground floor room
   vi)   All the rooms should have attached bathrooms

How-ever the Civil contractor who took the work, overshot the time and money available and hence Dr Sunil was unhappy with the Architect firm who recommended the Contractor.

Task:

- Split the class into groups of three
- Ask them to prepare 2D drawings   with Plan, Elevation, Sections and perspectives.
- Prepare the detailed WBS, a Project execution plan and Project communication plan for contractors
- Estimate the quantities
- Discuss on the possible reasons for delay and methods with which performance to both time and budget could have been achieved
- Present it in a seminar, with each group getting 5-10 minutes to present their idea.

Case Study 2a:

The Columbus Hospital proposed in Hubli is a 200 bed speciality private hospital for treatment of Cancer. The hospital will come up on a 12 acre plot between Hubli-Dharwad. A leading construction company has come forward to complete the hospital works from concept to commissioning in 9 months. The promoters are willing to spend a premium to complete the hospital in 9 month time and are not particular about type of construction, ie, RCC, Steel frame etc. The key requirements are as follows:

i)   200 bed hospital of which 40 are for critical care (ICU), 40 for pre and post-Operative care
ii)   4 Operation Theatres - 2 Major (Minimum 800 SFT each) and 2 minor (minimum 400 sft each)
iii)   One full-fledged Diagnostic laboratory (1500 Sft)
iv)   One 24x7 pharmacy (360 Sft min)
v)   Doctors rooms, Nurses enclosures, Change rooms
vi)   Office with billing counters (min 2000 sft) for all administrative staff
vii)   Wheel chair parking bays, Stretcher parking bays in all floors
viii) One Cafeteria with 50 person capacity
ix)   One conference room with Multimedia equipment (300 sft min)
x)   Parking for ambulances, 4 wheelers, two wheelers
xi)   Reception and enquiry counter
xii)   All amenities should be accessible for disabled persons
xiii) Incinerator, Waste storage and disposal area
xiv)   Generator and fuel storage area

Discuss

i)   The various alternative approaches available to complete the hospital.
ii)   Look into National Building Code and BIS standards for arriving at approximate (+/- 10%) super built-up area required, amenities to be planned
iii)   The various phases of the project according to Project lifecycle and durations
iv)   Prepare the detailed WBS, Project Organization required and Project Dairy template
v)   Prepare a Project Plan with risks involved and the risk management plan.
vi)   Estimate the cost of time overrun if the project is delayed by 114 calendar days due to issues with approvals

Case Study 2b:

For case study 2 above, prepare an Implementation Plan using a spread sheet software.

Discuss

i)   What happens if a pandemic affects the project in its 7th Month. How do you mitigate the possible issues in implementation?
ii)   What happens if during the fourth month of projects the client decides to reduce funds for the month by 50% ?

Case Study 2c:

For case study 2 above, prepare a Critical Path method Chart (CPM) showing all main activities in the WBS with milestones.

Discuss

xvi)   What happens if the client decides to complete the ground floor roof 15 days earlier ?

xvii) What happens if the client reduces the inflow of project funds by 50% for the month 4 ?

xviii) Write an Audit report for the project at the end of 6th month

Case Study 3:

This will be done as a student activity and has two components.

i)   Research on 3D printing in any industry and prepare a three page article

ii)   Study usage of Drones in different Industries and evaluate the Cost benefits of using the same for any one scenario.

Model Question Paper

I A Test (CIE)

Programme:	Semester: II
Course:	Max Marks: 30
Course Code:	Duration: 1 Hr 20 minutes
Name of the course coordinator:	Test: I/II/III

Note: Answer one full question from each section. One full question carries 10 marks.

Qn.No	Question	CL	CO	PO	Marks
	Section-1				
1.a)					
b)					
c)					
2.a)					
b)					
c)					
	Section-2				
3.a)					
b)					
c)					
4.a)					
b)					
c)					
	Section-3				
5.a)					
b)					
c)					
6.a)					
b)					
c)					

Model Question Paper
Semester End Examination

Programme:	Semester: II
Course:	Max Marks: 100
Course Code:	Duration: 3 Hrs

Instruction to the Candidate:
Answer one full question from each section. One full question carries 20 marks.

Qn.No	Question	CL	CO	Marks
	Section-1			
1.a)				
b)				
2.a)				
b)				
	Section-2			
3.a)				
b)				
4.a)				
b)				
	Section- 3			
5.a)				
b)				
6.a)				
b)				
	Section-4			
7.a)				
b)				
8.a)				
b)				
	Section-5			
9.a)				
b)				
10.a)				
b)				

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Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

</div>

Course Code	20CE21P	Semester	II
Course Title	**CIVIL ENGINEERING GRAPHICS**	**Course Group**	Core
No. of Credits	4	**Type of Course**	Lecture & Drawing Exercise
Course Category	PC	**Total Contact Hours**	6Hrs Per Week
			78Hrs Per Semester
Prerequisites	High School Level Mathematics	**Teaching Scheme**	(L:T:P)= 1:0:2
CIE Marks	60	**SEE Marks**	40

Prerequisites: Basic Geometry in Secondary Education and zeal to learn the course.

Course Objectives:

1. The course is aimed at developing Basic Drawing skills.

2. Skills in Reading and Interpretation of Engineering Drawings.

3. Skills in usage of CADD software.

On successful completion of the course, the students will be able to:

	Course Outcome	**CL**	**Linked PO**	**Teaching Hrs**
CO1	Acquire Knowledge about importance of Engineering drawing and use of drawing instruments effectively and Able to draw figures to given scale and dimension the given figures as per BIS	R,U,Ap	1,2,4	09
CO2	Acquire knowledge about geometric constructions and conic section and to learn their application in civil engineering field	R,U,Ap	1,2,4	06
CO3	Discover the concept of projection and acquire visualization skills related to projections of points, Lines, planes and solids	R,U,Ap	1,2,4	27
CO4	Develop the ability to draw the isometric view from the orthographic views and Convert isometric views into orthographic views and learn concept of 3D visualization	R,U,Ap	1,2,4	18
CO5	Interpret the basic concept and usage of CADD software. Compare the utilities of alternate drafting software from open source. Setup CADD workstation and demonstrate basic commands of Computer Aided Design and Drafting Software.	R,U,Ap	1,2,4	18
Total sessions				78

Legend- R: Remember U: Understand Ap: Application Ay: Analysis

Course Outcome and Programme outcome mapping

COS	___	___	___	___	___	___	___
___	PO1	PO2	PO3	PO4	PO5	PO6	PO7

Second Semester - CO & PO Mapping of Civil Engineering Graphics 20CE22D

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7
C205.1	3	3	-	1	-	-	-
C205.2	3	3	-	1	-	-	-
C205.3	3	3	-	1	-	-	-
C205.4	3	3	-	1	-	-	-
C205.5	3	3	-	1	-	-	-
AVG	**3**	**3**	**-**	**1**	**-**	**-**	**-**

Programme outcome Attainment Matrix

Course	Programme Outcome							PSO 1	PS O2
	PO1	PO2	PO3	PO4	PO5	PO6	PO7		
	Basic and Discipline specific knowledge	Problem analysis	Design/ development of solutions	Engineering Tools, Experimentation and Testing	Engineering practices for society, sustainability and environment	Project Management	Life-long learning		
CIVIL ENGINEERING GRAPHICS	3	3	-	1	-	-	-	2	2

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If >40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not addressed.

COURSE CONTENTS

UNITS	CONTENT	HOURS
1	➢ **INTRODUCTION TO ENGINEERING DRAWING AND DRAWING INSTRUMENTS** • Introduction to Engineering drawing, • Drawing Instruments, Standard Sizes of Drawing sheets-Layout of drawing sheets, Folding of Drawing sheets as per Bureau of Indian Standards, • Types of lines and their applications, Conventions used in Civil Engineering ➢ **DIMENSIONING PRACTICE** • Introduction to Dimensioning, Elements of Dimensioning, Systems of Dimensioning, Methods of arrangements of Dimensioning • Representative Fraction and Scales recommended by the Bureau of Indian Standards(Reducing scale, Enlarging scale and Full scale) • Dimensioning of common features like diameters, radii, arcs and chords and simple Civil Engineering Objects.	09
2	➢ **GEOMETRIC CONSTRUCTIONS** • To divide a line into any number of equal parts • Construction of regular Polygons using different methods ➢ **CONIC SECTIONS** • Elements of Ellipse and Parabola • Applications of Ellipse and Parabola in engineering constructions • Construction of Ellipse by Concentric Circle method and Rectangle method • Construction of Parabola by Rectangle method and Parallelogram method	06
3	➢ **ORTHOGRAPHIC PROJECTION OF POINTS** • Introduction to orthographic projection-Principal planes of projection- Four Quadrants- Concept of First angle & Third angle projection • Methods-Projection of points in all the four quadrant system. Practicing exercises on projection of points in all four quadrants ➢ **ORTHOGRAPHIC PROJECTION OF LINES** • Projection of lines - Line Parallel to both HP and VP, Line parallel to one plane and Perpendicular to other-Line parallel to one plane and Inclined to the other, Line inclined to both HP and VP. • Practicing of exercises on projection of lines in different positioning	12

4	➢ **ORTHOGRAPHIC PROJECTION OF PLANES** • Projection of Plane surface: Parallel to one and perpendicular to the other planes of projection, Perpendicular to one and inclined to the other planes of projection, Plane surface inclined to both planes of projection. • Practicing of exercises on projection of planes in different positioning ➢ **ORTHOGRAPHIC PROJECTION OF SOLIDS** • Introduction-Positioning of solids -Solid lying with base on HP-Solids lying with base or axis inclined to HP, solid with lateral faces, lateral edge on HP, Solids lying with their base inclined to both HP and VP. (Solids like- prisms, pyramids, cone and cylinder) • Practicing of exercises on projection of solids in different positioning	15
5	➢ **ISOMETRIC VIEWS** • Principles of isometric Views, Isometric views of regular polygons. • Conversion of orthographic views into isometric View- Drawing of Isometric views of solids like prisms, pyramids, cylinder and cone. • Conversion of orthographic views into isometric View -Drawing of Isometric views of combination of solids and simple civil engineering objects • Conversion of isometric views into orthographic views	18
6	**BASIC CADD IN CIVIL ENGINEERING** ➢ **Introduction to CADD** • General features of CADD, CADD work station, Hardware and Software requirements • Advantages of using CADD, Starting CADD, Understanding CADD • Editor Screen- title bar, menu bar, dashboard, standard tool bar, drawing area, UCS, command prompt area, status bar. ➢ **Demonstration of commands in CADD** • Commands- Command Entry Options using -Command Line, Menus (File Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help) and Dialog Boxes. • Understanding the use of CADD Menus and Tool Bars • CADD Basic Entities- Drawing Line, Arc, Circle, Rectangle and polygons using different coordinate Systems such as Absolute Cartesian Coordinates, Relative Cartesian Coordinates, and Absolute Polar coordinates, Relative Polar Coordinates • Direct distance entry and line command, picking coordinates on the screen and line command • Using a wizard, using a template, starting from scratch. • Selection of units, Selection of paper space, Setting up of limits • Four Exercises on 2 Dimensional drawings • Exercises on isometric views(Conversion of Orthographic projection to Isometric view) • Exercises on isometric views(Conversion of Isometric view to Orthographic projection)	18
Total		**78 Hrs**

Note: Graded exercises Plan in each unit should be as per table provided below.

Course Delivery:
Unit 1 to Unit 5: The course content will be delivered through lectures and Power point

presentations/ Videowith classroom practices (Manual drawing)
Unit 6 : The course content will be delivered through lectures with demonstration in CADD laboratory with lab practice using CADD software

UNIT	DETAILED COURSE CONTENT	CO	PO	Contact Hrs
UNIT-1 :INTRODUCTION TO ENGINEERING DRAWING AND DIMENSIONING PRACTICE				
1	• Introduction to Engineering drawing, • Drawing Instruments, Standard Sizes of Drawing sheets • Layout of drawing sheets, Folding of Drawing sheets as per Bureau of Indian Standards	CO1	1,2,4	3
	• Types of lines and their applications, Conventions used in Civil Engineering • Introduction to Dimensioning, Elements of Dimensioning, Systems of Dimensioning • Methods of arrangements of Dimensioning	CO1	1,2,4	6
	• Representative Fraction and Scales recommended by the Bureau of Indian Standards(Reducing scale, Enlarging scale and Full scale) • Dimensioning of common features like diameters, radii, arcs and chords and simple Civil Engineering Objects.	CO1	1,2,4	9
UNIT-2 GEOMETRIC CONSTRUCTION AND CONIC SECTIONS				
2	• To divide a line into any number of equal parts • Construction of regular Polygons using different methods • Elements of Ellipse and Parabola	CO2	1,2,4	12
	• Applications of Ellipse and Parabola in engineering constructions • Construction of Ellipse by Concentric Circle method and Rectangle method • Construction of Parabola by Rectangle method and Parallelogram method	CO2	1,2,4	15
UNIT-3 : ORTHOGRAPHIC PROJECTION,PROJECTION OF POINTS AND LINES				
3	• Introduction to orthographic projection • Principal planes of projection- Four Quadrants • Concept of First angle & Third angle projection method	C03	1,2,4	18
	• Projection of points in all the four quadrant system. • Exercises on projection of points in all four quadrants	CO3	1,2,4	21
	• Introduction to projection of line • Projections of Line Parallel to both HP and VP • Projection of Line parallel to one plane and Perpendicular to other	CO3	1,2,4	24
	• Projections of Line parallel to one plane and Inclined to the other • Projection of line inclined to both HP and VP.	CO3	1,2,4	27
UNIT-4 : ORTHOGRAPHIC PROJECTION AND PROJECTION OF PLANES AND SOLIDS				
4	• Introduction to projection of planes. • Projection of plane surfaces parallel to one plane and perpendicular to the other • Projection of Plane surface perpendicular to one plane and inclined to other	CO3	1,2,4	30

	• Projection of Plane surface inclined to both HP and VP • Exercises on projection of planes	CO3	1,2,4	33
	• Introduction-Positioning of solids • Solid lying with base on HP • Solids lying with base or axis inclined to HP.	CO3	1,2,4	36
	• Positioning of solid with lateral faces, lateral edge on HP • Solids lying with their base inclined to both HP and VP	CO3	1,2,4	39
	• Exercises on projection of solids	CO3	1,2,4	42
UNIT-5 : ISOMETRIC VIEWS				
5	• Principles of isometric Views • Isometric views of regular polygons.	CO4	1,2,4	45
	• Conversion of **orthographic projection into isometric View** of solids like prisms, pyramids, cylinder, cone.	CO4	1,2,4	48
	• Conversion of orthographic projection into isometric Views of combination of solids and simple civil engineering objects	CO4	1,2,4	51
	• Conversion of **isometric views into orthographic projection** of combination of solids	CO4	1,2,4	54
	• Conversion of isometric views into orthographic projection of simple civil engineering objects	CO4	1,2,4	57
	• Exercises on isometric views	CO4	1,2,4	60
UNIT-6 : BASIC CADD IN CIVIL ENGINEERING				
6	➢ **Introduction to CADD** • General features of CADD, CADD work station, Hardware and Software requirements, • Advantages of using CADD, Starting CADD • Understanding CADD Editor Screen- title bar, menu bar, dashboard, standard tool bar, drawing area, UCS, command prompt area, status bar. ➢ **Demonstration of commands in CADD** • Commands- Command Entry Options using -Command Line, Menus (File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help) and Dialog Boxes. Understanding the use of CADD Menus and Tool Bars	CO5	1,2,4	63
	• CADD Basic Entities- Drawing Line, Arc, Circle, Rectangle and polygons using different coordinate Systems such as Absolute Cartesian Coordinates, Relative Cartesian Coordinates, and Absolute Polar coordinates, Relative Polar Coordinates • Direct distance entry and line command, picking coordinates on the screen and line command. • Using a wizard, using a template, starting from scratch. • Selection of units, Selection of paper space, Setting up of limits	CO5	1,2,4	66
	• Four Exercises on 2 Dimensional (2D) drawings	CO5	1,2,4	69
	• Exercises on isometric views(Conversion of Orthographic projection to Isometric view)	C05	1,2,4	72
	• Exercises on isometric views (Conversion of Orthographic projection to Isometric view)	C05	1,2,4	75
	• Exercises on isometric views (Conversion of Isometric view to orthographic projection)	C05	1,2,4	78

Course Assessment and Evaluation Chart

Assessment Method	Type of Assessment		Target	Assessment methods	Max Marks	Type of record	Duration
Direct Assessment	CIE Continuous Internal Evaluation	**Portfolio Evaluation of drawing**	STUDENT	Marks awarded for each unit exercises	**20** (Average of all units marks)	Drawing sheet with log sheet (to be folded as per BIS and filed)	Submissions to be taken after the completion of every unit
		Skill tests		Skill Test 1　[unit 1,2 , (part of 3)]	**20** (Average of 2 tests)	Manual drawing	180 minutes
				Skill Test 2 [(part of unit 3) & unit 4 & unit 5]		Manual drawing	180 minutes
				Skill Test 3 (unit 6)	**20** marks	Drawing execution using CADD	180 minutes
				Total CIE Marks	**60 marks**	All the above	End of semester
	SEE	Semester End Exam		SEE	**40 marks**	Answer sheets & CADD execution.	180 minutes
				Total	**100 marks**		
Indirect Assessment	Student feedback		STUDENT	Middle of the course	-NA-	Feedback forms	Middle of semester
	End of Course survey			End of course		Questionnaire	End of the semester

Note:
1. CIE is conducted for 60 marks and SEE is conducted for 100 Marks & Weightage is reduced to 40 marks
2. Three Skill tests to be conducted for 100 marks (3 Hrs) and should be reduced to 20 marks and average marks of skillTest 1 and skill test 2 shall be rounded off to the next higher digit.
3. Content of Unit 3 can be divided for Skill test 1 and skill test 2 as required
4. CIE & SEE to be conducted as per the scheme of Evaluation below

Scheme of Evaluation for CIE : SKILL TEST 1 AND SKILL TEST 2

<div align="center">MODEL QUESTION PAPER FOR SKILL TEST 1</div>

Programme :				Semester: I
Course :				Max Marks :100
Course Code :				Duration :180 minutes
Name of the course coordinator:				SKILL Test : I
Note: Answer the following questions. One full question carries 20 marks.				

Qn.No	Question	CL	CO	PO	Marks
	Section-1 (UNIT 1)				
1.a)					20
	OR				
b)					20
2.a)					20
	OR				
b)					20
	Section-2(UNIT 2)				
3.a)					20
	OR				
b)					20
4.a)					20
	OR				
b)					20
	Section-3(PART OF UNIT 3)				
5.a)					20
	OR				
c)					20

<div align="center">MODEL QUESTION PAPER FOR SKILL TEST 2</div>

Programme :				Semester: I
Course :				Max Marks :100
Course Code :				Duration :180 minutes
Name of the course coordinator:				SKILL Test : II
Note: Answer one full question from each section. One full question carries 10 marks.				

Qn.No	Question	CL	CO	PO	Marks
	Section-1 (PART OF UNIT 3)				
1.a)					20
	OR				
b)					20
	Section-2(UNIT4)				
2.a)					20
	OR				
b)					20
3.a)					20
	OR				
b)					20
	Section-3(UNIT 5)				
4.a)					20
	OR				
b)					20

1	Viva	10 marks
2	Concept of CADD work station and Demo of commands	20 marks
3	Drawing of Isometric view (orthographic projection to isometric view)	35 marks
4	Drawing of Isometric view (Isometric view to orthographic projection)	35 marks
	Total	**100 marks**

5.a)					20
	OR				
b)					20

Scheme of Evaluation for CIE – SKILL TEST 3 (Practical mode)

Scheme of Evaluation for SEE (Practical mode)

Sl. No		Questions	Max. Marks
		SECTION 1: Manual Drawing in given answer sheet	
A)	i.	Question from Unit 1 or 2	25
	Or		
	ii.	Question from Unit 3	
B)	i.	Question from Unit 4	25
	Or		
	ii.	Question from Unit 5	
		SECTION 2 : Basic CAD Drawing	
C)		i) One exercise execution on Isometric Views using CADD	40
		ii) Dimensioning of the CADD drawing executed	10
		Total	**100**

GRADED EXERCISE PLAN

Unit no	Name of the unit	Drawing Sheets	Title of the drawing	Minimum no of exercise
I	INTRODUCTION TO ENGINEERING DRAWING AND DIMENSIONING PRACTICE	1	Use of drawing instruments	05
		2	Dimensioning	05
II	GEOMETRIC CONSTRUCTION AND CONIC SECTIONS	2	Geometric construction	05
			conic sections	08
III	ORTHOGRAPHIC PROJECTION PROJECTIONOF POINTS AND LINES	2	Projection of Points	10
		3	Projection of Lines	15
IV	ORTHOGRAPHIC PROJECTION OF PLANES AND SOLIDS	3	Projection of Planes	15
		5	Projection of Solids	20
V	ISOMETRIC VIEWS	6	Isometric Views	30

VI	BASIC CADD IN CIVIL ENGINEERING	Printouts	CADD applications	10

TEXT BOOK

1.   K.R.Gopalakrishna "Fundamentals of Drawing" Subhas Publications, 2010.
2.   K.R.Gopalakrishna "Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, "A text book of Engineering Drawing", S.Chand Publishers, Delhi, 2010.
2. G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
5. DhananjayA.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGrawHill Publishing Company Limited, 2008.
6. BasantAgarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. IS 962 (1989) Code of practice for Architectural and Building Drawings
8. CAD in Civil Engineering a Laboratory Referrel- DrM.A.Jayaram, D.S.Rajendra Prasad, Sapna Book House
9. Sham Tickoo-CADD: A Problem-Solving Approach Thomson Learning EMEA, Limited George Omura- Mastering Auto CAD BPB Publication
10.   Arshad N Siddique, ZahidKhab, Mukhtar Ahmed- Engineering Drawing with CADD

E-Learning:

ORIGAMI	https://www.youtube.com/watch?v=a3WFm8Yffm4
UNIT 1	https://www.youtube.com/watch?v=z4xZmBpXIzQhttps://www.youtube.com/watch?v=uojN7SOHPBw https://www.youtube.com/watch?v=w2-a_EzO4-Q https://www.youtube.com/results?search_query=dimensioning
UNIT 2	https://www.youtube.com/watch?v=rt7qTvPYVXE https://www.youtube.com/results?search_query=conic+sections+in+engineering+drawing
UNIT3	https://www.youtube.com/watch?v=SB83cUaAiCMhttps://www.youtube.com/watch?v=fK4h5gM73w8&list=PLIhUrsYr8yHxEk_Jv8yOatn3Dcr6KYK3jhttps://www.youtube.com/watch?v=FtugLo9DMw8&list=PLIhUrsYr8yHz_FkG5tGWXaNbIxVcibQvV
UNIT4	https://www.youtube.com/watch?v=AoNIOxnxDO0&list=PLIhUrsYr8yHx7TVB51jN3HZVyW3R6RiBg https://www.youtube.com/watch?v=YV4RZNQ2yB8&list=PLIhUrsYr8yHxARPzEFz1nXgt8j6xF_tEm
UNIT5	https://www.youtube.com/watch?v=Vo9LC9d7FQA&list=PLIhUrsYr8yHxVky7bfrnbRcdXcHjT_K83 https://www.youtube.com/watch?v=f1Hdtf_iAWk
	https://www.youtube.com/watch?v=It2jXzsXrVw&list=PLrOFa8sDv6jd0R3IzK-olrYadMkwsDG2g

UNIT6	http://www.sketchup.com http://www.autodesk.in/products/3ds-max/overview http://www.we-r-here.com/cad/tutorials/index.htm http://www.cadtutor.net/tutorials/CADD/ http://www.caddprimer.com/CADD_training_tutorial/CADD_training_lessons.html http://www.CADDmark.com/ http://www.CADDtutorials.net/ https://www.youtube.com/watch?v=J2LiXosRKKk https://www.youtube.com/watch?v=8rkkYc8mFck

Infrastructure required

1. Latest Configuration Computers which can be able to run latest any Computer Aided Drafting Software. (At least One Computer per student in practical session.)-30 no
2. Any latest Authorized Computer Aided Drafting Software (30 user licenses)
3. Plotter of size A2/A3
4. LCD Projector
5. Drawing Table with chair in drawing room

ACTIVITIES

Course co coordinator	❖ Course coordinator should make the student understand the importance of Engineering graphics, study and deliver the course content effectively. ❖ Focus should be on proper selection of drawing instruments and their proper use. ❖ Emphasis should be given on cleanliness, dimensioning and layout of sheet. ❖ Course coordinator should show model of real component/part and should give live applications of those, whose drawing is to be made. ❖ Students should be encouraged to practice manual drawing and CADD drawings and to be given with activities to perform which can enhance their skills towards engineering objects ❖ At regular interval students should be assessed for the skill attainment. ❖ Encourage students for improvement in performance through skill tests and portfolio Evaluation ❖ Students should be encouraged for blended learning and flipped learning
Program coordinator	❖ The department should procure AutoCADD or other engineering graphics software for practice in engineering graphics. ❖ Separate CADD labs and drawing room for practice on Engineering graphics should be set up ❖ Monitor the progress of skill learning among the students.
Student(suggested)	The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage. ❖ Plot the different line styles used in Civil Engineering drawing. ❖ Collect and measure the dimensions of different paper sizes available in market. ❖ Develop a 3D model of simple objects like cube, prism, cylinder and cone. ❖ Develop a conic section ❖ Object of preparing models - Learn the art of **ORIGAMI** to prepare models • Rectangular prism, Rectangular pyramid, • Triangular prism and pyramid, Square prism and pyramid, • Pentagonal prism and pyramid, • Hexagonal prism and pyramid ,

	• Octagonal prism and pyramid, • Decagonal prism and pyramid, • Cube, cone , cylinder, tetrahedron, octahedron • Simple Civil Engineering objects

LOG SHEET FOR PORTFOLIO EVALUATION (Model)

(To be maintained by the student for portfolio evaluation along with filing)

| SI.NO	DATE OF SUBMISSION	UNIT	TITLE OF THE DRAWING	NO OF SHEETS	MARKS AWARDED	SIGNATURE OF COURSE COORDINATOR
1						
2						

MODEL QUESTION BANK

Course: **CIVILENGINEERING GRAPHICS** Code: **20CE21P**

UNIT-I
10 Marks Questions
1.   (a) List the standard sizes of drawing sheets.
    (b)Mention the types of lines and their applications.
2.   (a) Illustrate the elements of dimensioning with the help of a sketch.
b) Illustrate the dimensioning of given common features: diameter, radius, chord, Arc and angle.
3. (a) Mention the uses of the following drawing instruments.
        i) T-square ii) Set square iii) Bow compass iv) Clinograph v) Mini-drafter
        b) Mention the uses of the following drawing instruments.
        i) French curves ii) Protractor iii) Clips iv) Erasing Shield v) Drafting machine
        Mention the types of lines and their applications (10 marks questions)

4. Copy the given sketch to 1:1 scale and dimension adopting aligned system with parallelDimensioning method.
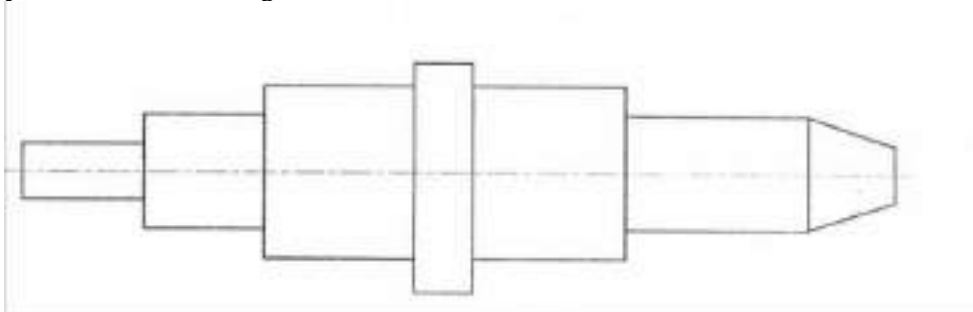
5. Copy the given sketch to 1:1 scale and dimension adopting aligned system with progressive dimensioning method.
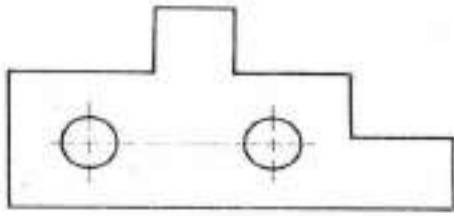
6. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with chain
   dimensioning method.
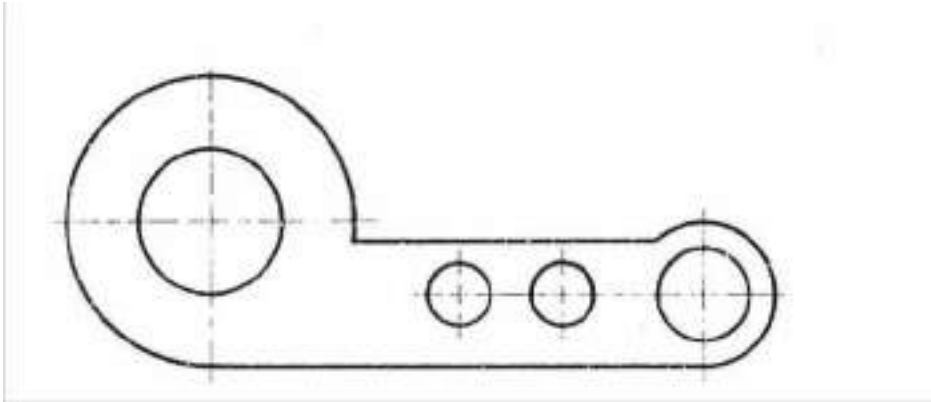
7.Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with combined
dimensioning method.
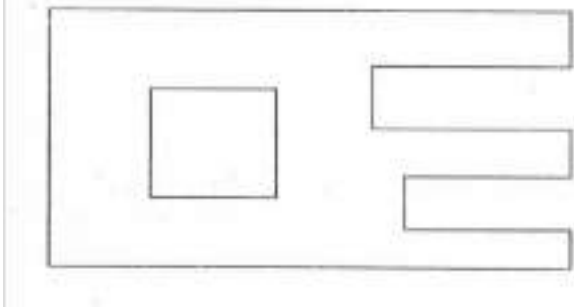
8.   Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with parallel
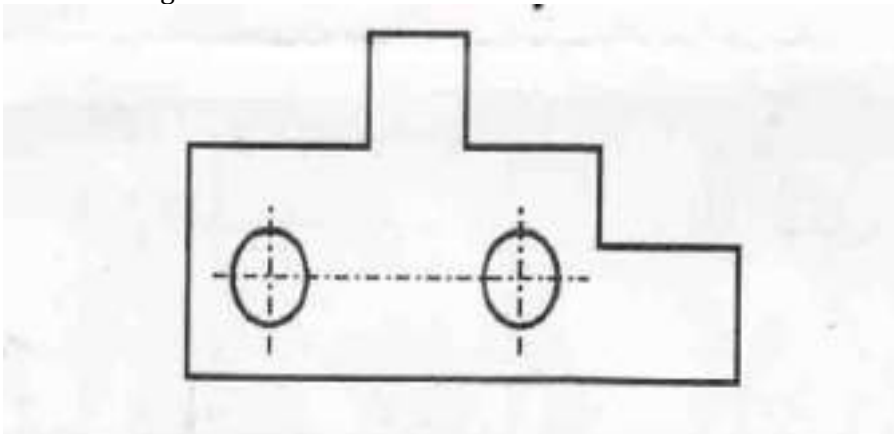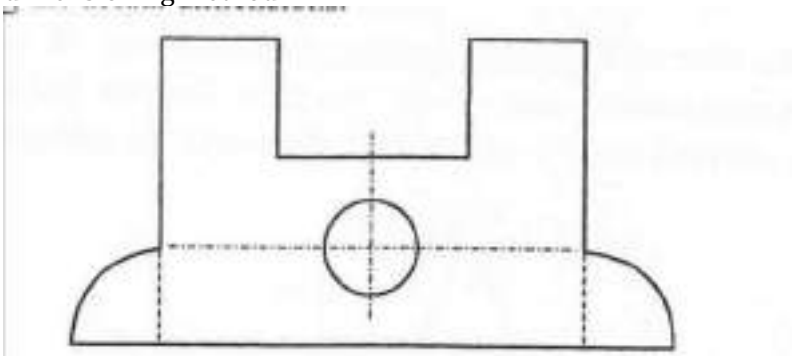dimensioning method.
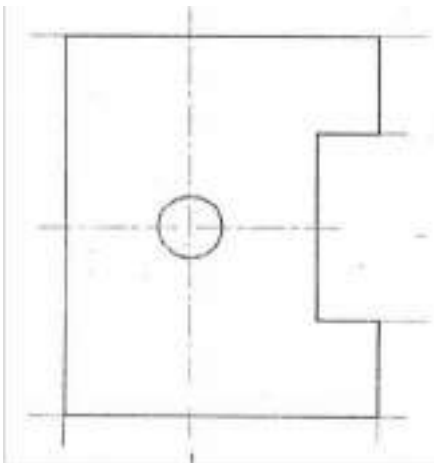
9. Copy the given sketch to 1:1 scale and dimension adopting aligned system with chain dimensioning method.
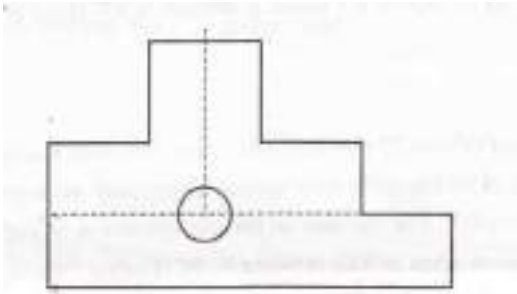
10. Copy the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method
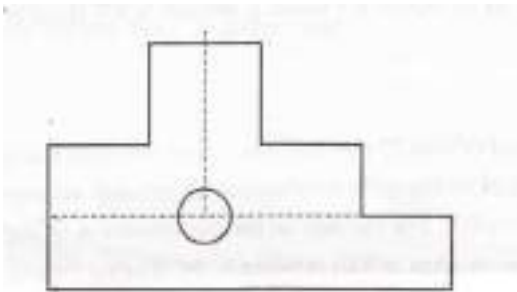
11. Copy the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method

12. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method

13. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method
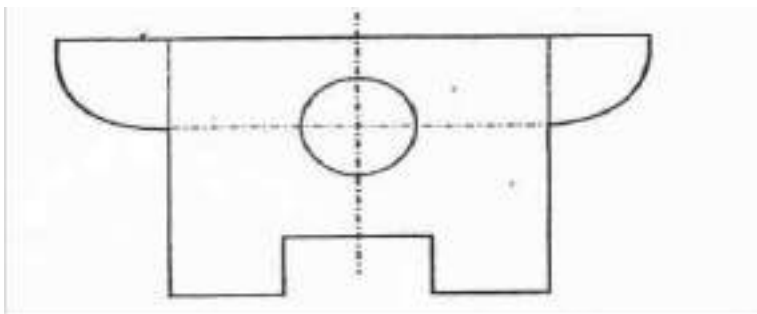
Unit II   (10marks)

14. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000.
15. An ellipse has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method.
16. Inscribe an ellipse in a rectangle of side 150mm and 120mm
17. Inscribe parabola in a rectangle of side 120mm and 80mm.
18. Inscribe parabola in a parallelogram of side 100mm and 70mm and having included angle 550
19. A shot is discharged from the ground level at an inclination of 550 to the ground which is assumed to be horizontal. The shot returns to the ground at a point 75m distance from the point of discharge. Trace the path of the shot. Take scale 1:1000.
20. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000.

UNIT-III   (10 marks Questions)

21. A point P is 40 mm in front of VP, 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point.

22. A point P is 30 mm above HP, 50 mm behind VP and 45 mm in front of left PP. Draw the three principal views of the point

23. Draw the three principal views of a point P lying 40 mm behind VP, 60 mm below HP and 30 mm behind the right PP.

24. Draw the three principal views of a point P lying 60 mm below HP, 50 mm in front of VP and 45 mm in front of the left PP.

25. Draw the three principal views of a line 90 mm long placed parallel to VP and perpendicular to HP. The line is 60mm in front of VP and 50mm in front of right PP. The lower end of the line is 40mm above HP.

26. Draw the three principal views of a line 90 mm long when it is placed parallel to both HP & VP. One of the ends of the line is 60 mm above HP, 30 mm in front of VP and 40mm in front of the right

PP.

27. A line AB 95 mm long is inclined at 40° to HP and parallel to VP. The line is 90 mm in front of VP. The lower end A is 35 mm above HP, 110 mm in front of the right PP and is away from it than the higher end. Draw the three principal views of the line.

28. A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three principal views of the line.

29. Draw the projections of a line AB, 80 mm long inclined at 30° to HP and parallel to VP. The line is 40 mm in front of VP. The lower end A is 20 mm above HP.

30. The length of a line is 100 mm long and is inclined at 45° to VP and parallel to HP. The line is15 mm above HP and one end of the line is 10 mm in front of VP. Draw the projections of the line and measure top and front views.

31. A line AB 80 mm long has one of its extremities 25 mm in front of VP and 30 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views.

32. A line AB measuring 70 mm has its end A 15 mm in front of VP and 20 mm above HP. The other end B is 60 mm in front of VP and 50 mm above HP. Draw the projections of the line with HP & VP.

33. A line PQ has its end P 15 mm above HP and mm in front of VP. The end Q is 55 mm above HP and the line is inclined at 30° to HP. The distance between the end projectors of the line when measured parallel to the line of intersection of HP &

34. VP is 50 mm. Draw the projections of the line and find its inclinations with VP.

35. The distance between the end projectors passing through the end points of a line AB is 40 mm. The end A is 20 mm above HP and 15 mm in front of VP. The line AB appears as 65 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP & VP.

UNIT-IV (15 marks questions)

36. An equilateral triangular lamina of side 50mm rests with one its sides on HP so that the surface of the lamina is inclined at 40° to HP. The side on which the lamina rests is inclined at 50° to VP. Draw the projections of the lamina.

37. An equilateral triangular lamina of sides 40mm is resting with one of its corners on HP, The surface of the lamina is inclined at 50° to HP and the side opposite to the corner on which the lamina rests is inclined at 40° to VP. Draw the projections of the lamina.

38. A square lamina of 40mm side rests with one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the square lamina in this position.

39. .A square lamina of 40mm sides rests with one of its corner on HP. The diagonal passing through this corner is inclined at 45° to VP and Lamina appears to be inclined at 35° to HP. Draw its projections.

40. A square lamina of side 40mm rests with one of its corner on HP. The diagonal passing through this corner is inclined at 55° to HP and 30° to VP. Draw its projections.

41. A hexagonal lamina of sides 30mm rests on one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the lamina.

42. A hexagonal lamina of side 30mm is resting with one of its corner on HP so that the diagonal passing through that corner is inclined at an angle of 45° and appears to be inclined at 30° to VP. Draw the top and front views of the lamina.

43. A square lamina of ABCD of 40mm side rests on the corner C such that diagonal AC appears as at 35° to the VP in the top view. The two sides BC and CD containing the corner C make equal

inclinations with the HP. The surface of the lamina makes 40° with HP. Draw its top and front views.

44. A pentagonal plane lamina of edges 30mm is resting on HP with one of its corner touching it such that plane surface makes an angle of 50° with HP. The two of the base edges containing the corner on which the lamina rests make equal inclinations with HP. If the edge opposite to this corner makes an angle of 40° with the VP, draw the top and front views of the plane lamina in this position.

45. A hexagonal lamina of 40mm sides rests on HP on one of its sides. The side which is on HP is perpendicular to VP and the surface of the lamina is inclined to HP at 45°.The lamina is then rotated through 90° such that the side on HP is parallel to the VP, while the surface is still inclined to HP at 45°. Draw the front view and the top view of the lamina in its final position.

46. A circular lamina of 65mm diameter rests on HP such that the surface of the lamina is inclined at 40° to HP. The diameter through the point on which the lamina rests on HP appears to be inclined at 50° to the VP in the top view. Obtain its projections.

47. A hexagonal pyramid, base 30mmside and axis 60mm long has one of its triangular face containing the slant edge on which it rests are equally inclined to HP. The axis appears to be inclined at 45^0 to VP. Draw its projections when its base is nearer to the observer than its apex.

48. Draw the projection of a pentagonal prism of base side 25mm and axis length 45mm resting on a corner such that the two base edges passing through it make equal inclination with HP and its base inclined at 60° to HP and the axis appears to be inclined at 30° to VP in the top view.

49. An equilateral triangular prism 30 mm side of base and 50mm long rests with one of its shorter edge on HP such that rectangular face containing the edge on which the prism rests is inclined at 30^0 to HP. The edge on which the prism rests is inclined at 60^0 to VP. Draw its projections.

50. A cone of base diameter 50mm and altitude 70mm is lying with one of its generators on HP and the axis appears to be inclined to VP at an angle of 40^0 in the top view. Draw its top and front views.

51. A Hexagonal prism of 30 mm side of base and axis 60mm long is placed with one of its base edges on HP such that the axis is inclined at 35^0 to HP and 45^0 to VP. Draw its projections.

52. A Pentagonal pyramid 25mm side of base and 50mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which rests make equal inclinations with HP. The axis is inclined at 50^0 to VP and 30^0 to HP. Draw the top and front views of the pyramid.

53. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45^0 to HP and 30^0 to VP. Draw the top and front views of the cone.

54. Draw the top and front views of a right cylinder of base 50mm diameter and 70mm long when it lies on HP, such that its axis is inclined at 30^0 to HP and axis appears to be perpendicular to VP in the top view.

55. An equilateral triangular prism of base side 25mm and 50mm long rests with one of the its shorter edges on HP so that the rectangular face containing the edge on which the prism rests

inclined at 30° to the HP. The edge on which the prism rests is inclined at 60° to the VP. Draw its projections.

56. A pentagonal prism of base edge 30mm and 60mm long has its base edge on HP. The axis of the prism is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the top view and the front views of the prism.

57. A hexagonal prism of 30mm base edge and axis 60mm long is placed with one of its base edges on HP so that the axis is inclined at 30° to HP and the axis appears to be inclined at 45° to VP. Draw the projections when the base of the prism is nearer to the observer.

58. A square prism of base edge 40mm and 60mm long rests with one of its corners of the base so that the longer edge passing through this corner is inclined at 40° to the HP. Draw the projections if the axis appears to be inclined at 45° to the VP in the top view.

59. A square pyramid of base edge 40mm and 60mm long has one of its shorter edges on HP. The axis of the pyramid is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the projections if the apex is near to the observer.

60. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections.

61. A cone of base diameter 50mm and axis 80mm lies on HP with its axis inclined at 45° to HP and appears to be inclined at 30° to the VP in the top view. Draw the top and front views of the cone.

62. A right cylinder is 50mm diameter of base and height 70mm. It rests such that the axis is inclined at 30° and 45° to HP and VP respectively. Draw the top and front views.

63. A cone of base 80mm diameter and height 100mm is lying with one of its generators on HP and its axis appears to be inclined at 40° to VP in the top view. Draw its front and top views.

64. Draw the projections of a pentagonal prism 20mm side of base and axis 40mm long resting on a corner such that two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP, and the axis appears to be inclined at 30° to VP in the top view.

65. Draw the top and front views of a rectangular pyramid of sides of base 20x25mm and height 35mm when it lies with one of its triangular faces containing the longer edge of the base on HP. This longer edge of the base containing the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid nearer to VP.

66. A pentagonal pyramid 20mm side of base of 35mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid.

67. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its slant edges on HP such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.

68. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° and 30° with HP and VP respectively. Draw the top and front views of the cone.

69. Draw the top and front views of a right cylinder of base 45mm diameter and 60mm long when it lies on HP, such that its axis is inclined at 30° to HP and the axis appears to be perpendicular to the VP in the top view
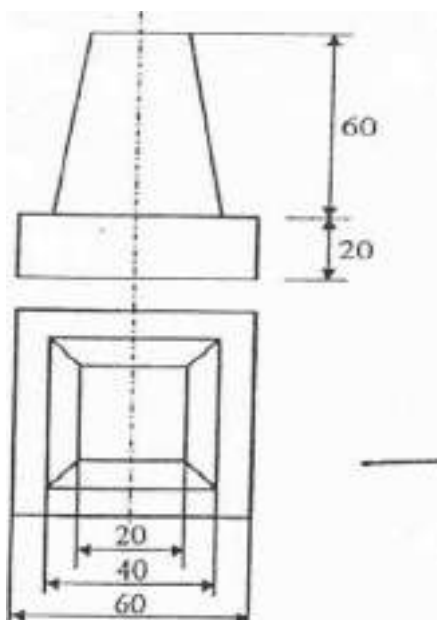
UNIT V   (**15 marks questions**)
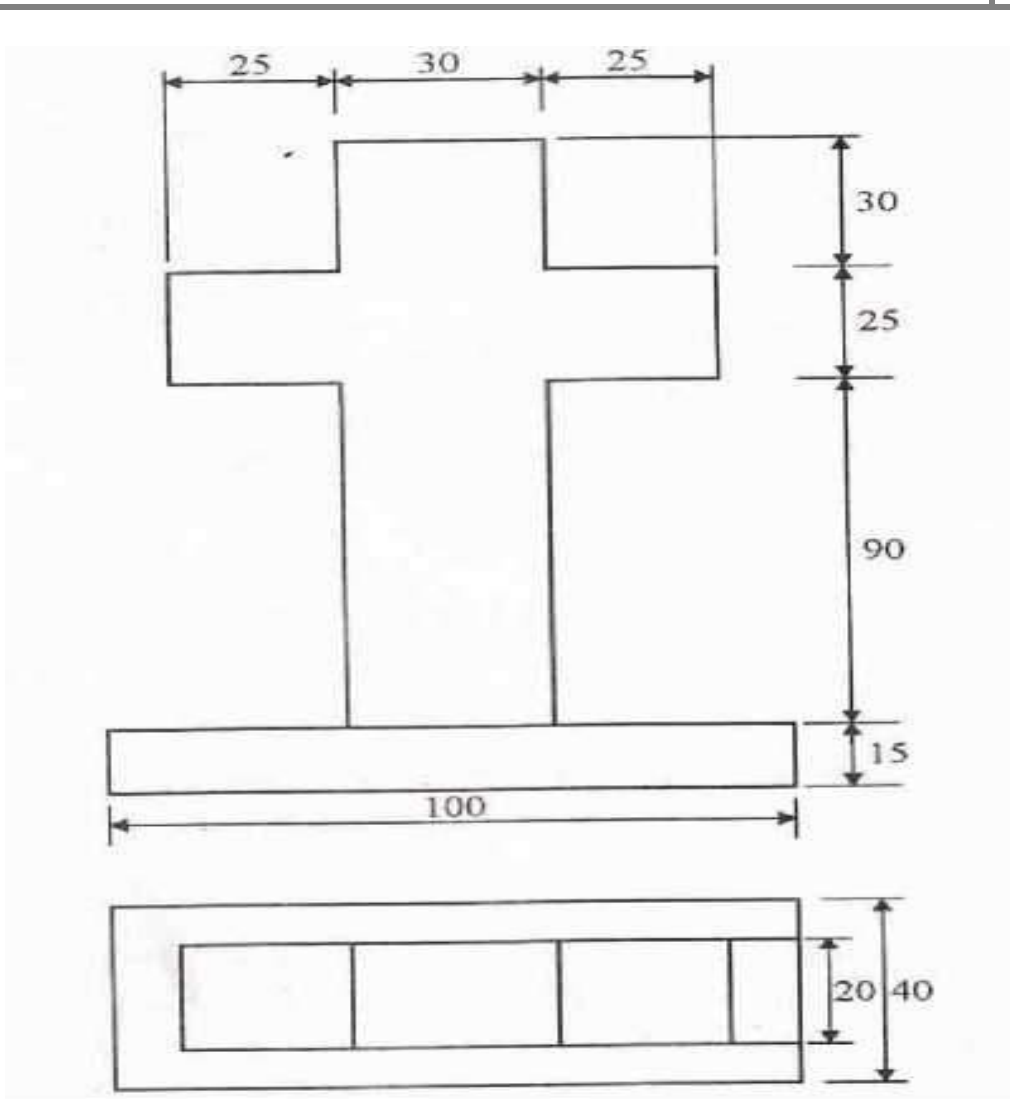1.   Draw the isometric view of the following objects whose orthographic views are given below:
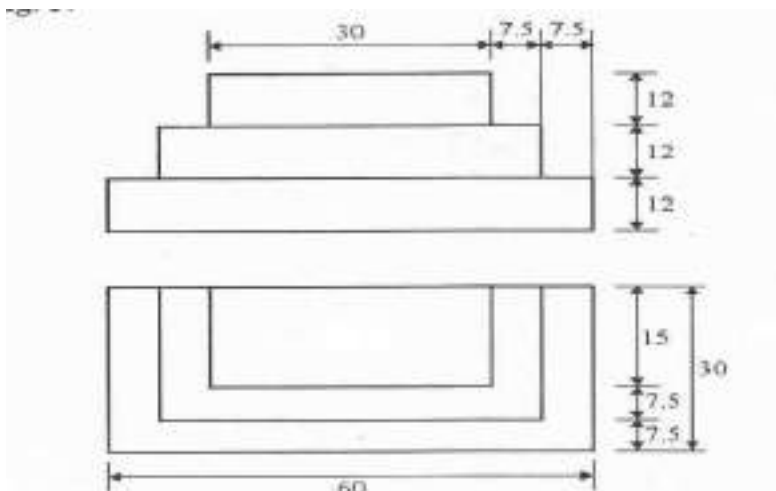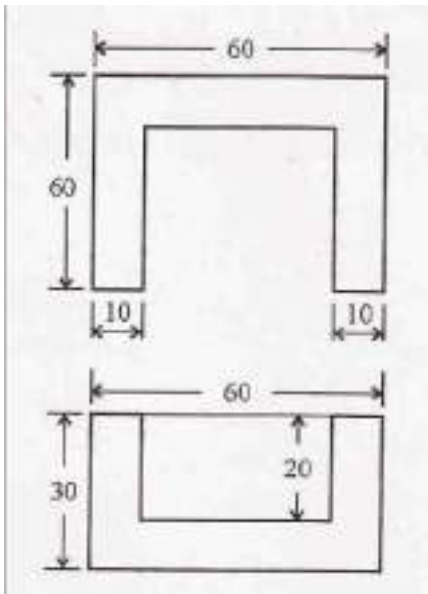

2.   Draw the isometric view of the following objects whose orthographic views are given below
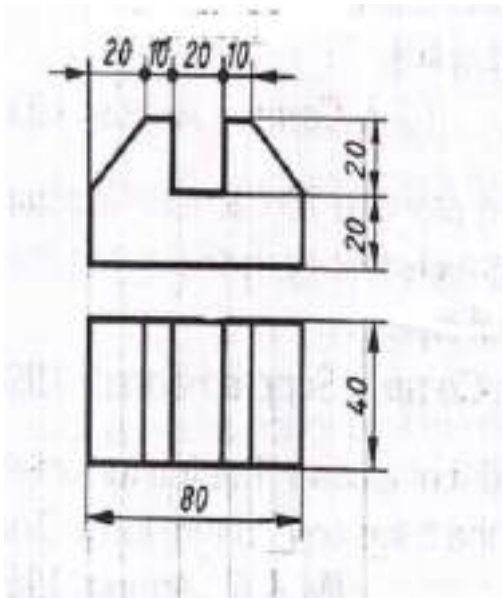

3. Draw the isometric view of the following objects whose orthographic views are given below
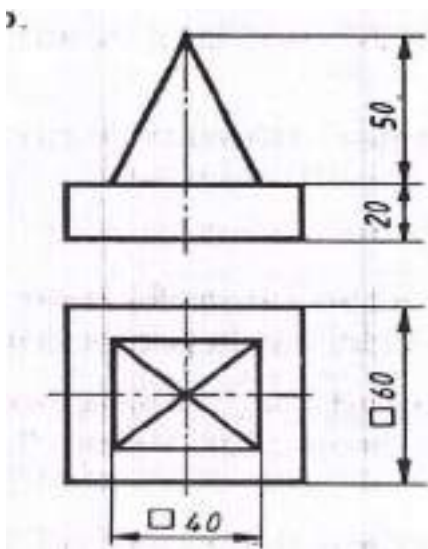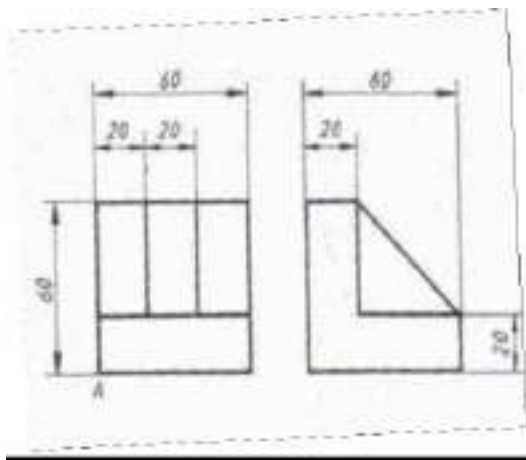
4.. Draw the isometric view of the following objects whose orthographic views are given below

5. Draw the isometric view of the following objects whose orthographic views are given below

5. A Circular column of side 40mm and height 50mm is placed centrally on a square footing of side 100mm and thickness 25mm. Draw the Isometric projections of the combination

6. A Cube of side 50mm is resting coaxially over a circular slab of diameter 100mm and thickness 30mm.Draw the isometric view of the combination of the solid. cone having diameter of the base 60mm and height 70 mm is resting co- axially on the square slab of side 100mm and thickness 40mm. Draw the isometric view of the combination of the solid.

7. A cylinder of 50mm diameter and 50mm high is placed centrally on the rectangular footing of sides 75mm and 100mm and thickness 25mm. Draw the isometric projections of the arrangement.

8. A frustum of a cone 30mm top diameter and 60mm bottom diameter and 70mm long is placed vertically on a square block of 80mm side and 30mm thick such that both the solids have common axis. Draw the isometric of the combination of the solids.

9. A cylindrical slab 100mm diameter and 40mm thick is supporting a cube of 50mm edge. On the top of the cube rests a square pyramid of altitude 55mm and side of base 30mm such that the base edges of the pyramid are parallel to the edges of the top face. The axes of the solids are in

the same straight line. Draw the isometric projection of the combination of the solids.

10. A square pyramid of base edge 50 mm and height 80 mm rests on the top of the cube of side 100 mm. Two sides of the base of the pyramid are parallel to the top edges of the cube. Draw the isometric view of the solid.

11. Three cubes of sides 60mm, 40mm and 20mm are placed centrally one above the other. Draw the isometric projections of the combination.
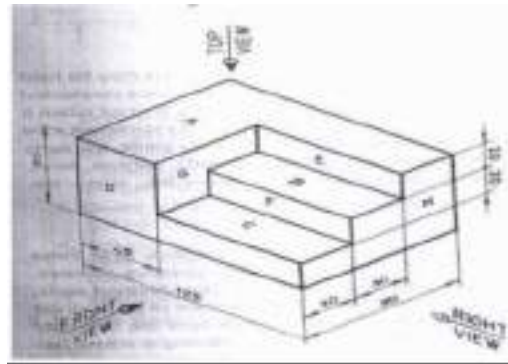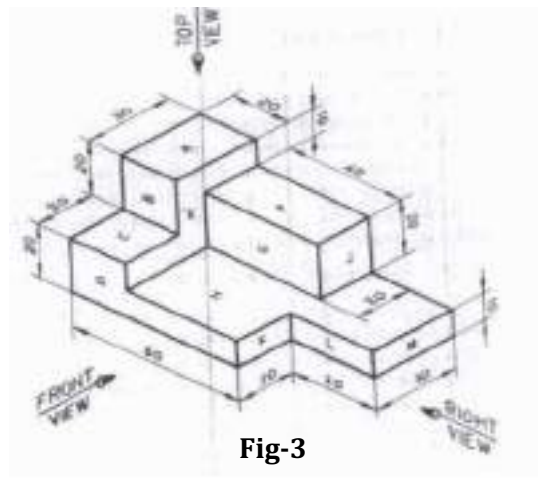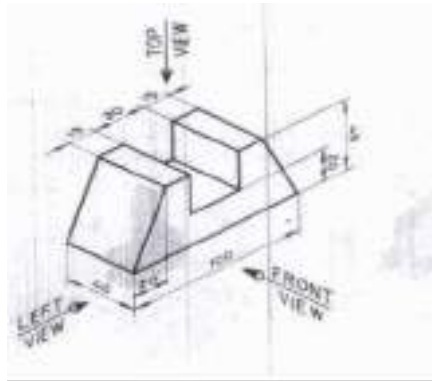
Fig-1

Fig-2

Fig-3

Fig-4

Fig-5
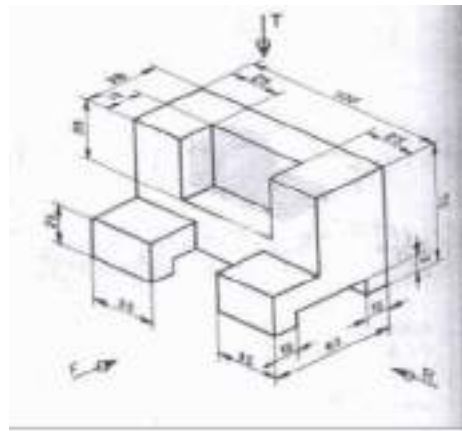
Fig-6

Course Code	20CE22P	Semester	II
Course Title	BASIC SURVEYING	Course Group	Core
No. of Credits	4	Type of Course	Lecture & Practice
Course Category	PC	Total Contact Hours	6 Hrs Per Week
			78 Hrs Per Semester
Prerequisites	BASICS OF MATHEMATICS & UNITS AND MEASUREMENTS	Teaching Scheme	(L:T:P)-1:0:2
CIE Marks	60	SEE Marks	40

1. COURSE SKILL SET

The aim of the course is to help student to attain the following industry identified competency through various teaching –learning experiences

    5 **Perform the fundamental tasks and computations in the field of Surveying.**

2. INSTRUCTIONAL STRATEGY

4. Students should be exposed to different tools and equipment used in respective tasks, Operational safety and Procedure to be followed to complete the tasks. Emphasis should be given on instrument handling, selection of suitable methods.
5. Focus should be on precise measurements, calculations and their interpretation.

3.COURSE OUT COMES

On successful completion of the course, the students will be able to demonstrate industry oriented CO's associated with the above mentioned competency:

CO1	Perform conversion of measuring units.
CO2	Identify different surveying instruments, tools and their applications.
CO3	Handle survey instruments, taking measurements, computation and interpretation.
CO4	Carryout different types of chain, tape, compass, levelling surveying tasks.
CO5	Identify errors and apply corrections suitably.

4. COURSE CONTENT

The following topics/subtopics to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

UNITS	Unit skill set (In cognitive domain)	Topics/Subtopics	Hours L-T-P
UNIT-1 INTRODUCTION	Introduction to surveying occupation 1)Definition, Objectives, and purposes of surveying. 2)Primary divisions and classifications of surveying 3)Principles of Surveying, Units and measurements (Linear and angular)	1.1 Responsibility of surveyor, Future possible progression and career development provisions on completion of the course. 1.2 Classifications based on nature of field, purpose of survey and instruments used. 1.3 Conversion of units (simple problems) Errors in surveying: Types-Mistakes, systematic and accidental.	02-00-04 (02 class of 3Hr duration)
UNIT-2 CHAIN SURVEY	- Describe the procedure of finding the distance between two inter-visible and non inter-visible survey stations. - Explain the method of ranging and measuring the length of the given survey line with examples. - Explain the corrections in measurement of distance with the chain in a given situation. - Compute area of given open field by using chain and cross staff. - Select type of chaining for given situation. - Applications of EDM & Rodometer in surveying.	2.1 Chain survey Instruments: Metric Chain details with neat sketch, engineers chain, guntur chain, revenue chain.Tapes-metallic tape and steel Tape. Arrow, Tapes, Ranging rod, Ranging poles,Offset rod, Open cross staff and wooden cross staff. 2.2 Ranging: Direct Ranging (I.By naked Eye II.using Line Ranger) and Indirect Ranging. 2.3 Chaining on flat ground and Chaining on sloping ground-by stepping method only. 2.4 Chain triangulation: Chain survey Station, Base line, Checkline, Tie line, Offset, Tie station. Selection of survey stations. Method of Chaining, obstacles in chaining; simple problems. Types of offsets: I. Perpendicular and Oblique. II.Short and Long offsets. 2.5 Errors in length: Instrumental error, personal error, error due to natural cause, random error- No numerical problems. 2.6 Location Sketch of survey station and running measurements of building.	05-00-10 (05 class of 3 Hr duration)

		2.7 Conventional Signs Recording of measurements in a field book.	
UNIT-3 COMPASS SURVEY	- Carry out the traversing in a given situation by using compass and chain. - Convert the given whole to reduced bearing and vice versa to find the included angle with examples. - Explain construction and functions of given parts of the given type of compass. - Determine correct bearings from the given observed bearings. - Explain the methods used to plot a traverse in the given situation. - Adjust the closing error of the traverse for the given data.	3.1 Technical Terms:Bearings-True, Magnetic and Arbitrary bearing. Geographic/True,Magnetic and Arbitrary Meridians. Systems of bearing-Whole circle bearing system and Reduced Bearing system-Examples on conversion of given bearing to another (from one to another) 3.2 Components of Prismatic Compass and their Functions, Method of using Prismatic Compass- temporary adjustments and observing bearings. 3.3 Compass traversing: Open and Closed traversing. Fore Bearing and Back Bearing, Calculation of interior and exterior angles from bearings at a station (For both WCB & RB systems) 3.4 Magnetic dip and declination: simple problems on declination. 3.5 Local attraction, sources of local attraction, detection of local attraction, Methods of correction of observed bearings-Correction at station. 3.6 plotting a traverse and finding closing errors. 3.7 Errors in compass: Instrumental, Personal and natural cause.	08-00-16 (08 class of 3 Hr duration)
	- Explain the given terms related to leveling. - Describe construction and use of the given leveling instrument.	4.1 Terminologies: Level surfaces, Horizontal and vertical surfaces, Datum, Bench Marks- GTS, Permanent, Arbitrary and Temporary. 4.2 Instruments used for levelling:Types of levels: Dumpy, Auto level, Digital	

| UNIT-4 LEVELLING | - Explain the given temporary adjustments of a typical dumpy level.

- Describe methods of reduction of levels by height of collimation and rise and fall method in the given situation with necessary checks.

- Select type of leveling for the given work with examples and justification.

- Compute the missing readings from the given observed readings. | level. Components of Dumpy Level and its fundamental axes,Temporary adjustments of Level. Levelling staff: Telescopic staff and target staff.

4.3 Reduced Level, Rise, Fall, Line of collimation, Station, Back sight, Fore sight, intermediate sight, Change point, Height of instruments. Observing the staff reading & recording in level book.

Leveling Types: Simple, Differential, Fly, Profile and Reciprocal Leveling.

4.5 Methods to find the R. L. in Level Book by H.I & Rise and Fall Methods with necessary checks.

4.7 Computation of missing readings.

4.8 Errors in Leveling | 11-00-22

(11class of 3 Hr duration) |

NOTE:

*1.*After one hour of lecture, two hours of practice should be conducted batch wise on the respective contents

2. All students should wear uniforms as specified, white round hat and Shoes.

3.Everyone is strongly advised to take care of his/her health and safety. When working, always be alert about your surroundings.

4.Set up the instruments in the safest possible location. Setting up the instrument should result in saving survey time as well. Safety always overrules the time saving.

5.Avoid contact of instruments with electrical supply lines, especially ranging rods and leveling staff.

6.Do not make sudden movements that might confuse a motorist and cause evasive action that can result in injury to the motorist and/or to students.

7.Avoid interrupting traffic as much as possible.

Sl. No.	Practical Outcomes/Practical exercises	Unit No.	PO	CO	L:T:P Hrs.
1	Units of measurements and Conversion of units.	1	1,7	1	0:0:2
2	Effective communication and signs used in survey practice.	1	1,7	2.3	0:0:2
3	Measure distance between two survey stations using chain, tape and ranging rods when two stations are inter visible.	2	1,2,34	2,3,4	0:0:2
4	Undertake reciprocal ranging and measure thedistance between two stations using EDM or RODOMETER	2	1,2,34	2,3,4	0:0:2
5	Set out perpendicular to the main survey line by different methods.	2	1,2,34	2,3,4	0:0:2

6	Determine area of regular polygons (Trapezium,Pentagon,Hexagon) using chain and cross staff survey	2	1,2,34	2,3,4	0:0:2
7	Undertake ranging when the chain line passes through different obstacles.	2	1,2,34	2,3,4	0:0:2
8	Measure Fore Bearing and Back Bearing of survey lines of open traverse using Prismatic Compass.	3	1,2,34	2,3,4	0:0:2
9	Measure Fore Bearing and back bearing of a closed traverse of 5 sides (Regular Pentagon) and correct the bearings and included angles for the local attraction.	3	1,2,34	2,3,4,5	0:0:2
10	Measure Fore Bearing and back bearing of a closed traverse of 6 sides (Regular Hexagon) and correct the bearings and included angles for the local attraction.	3	1,2,34	2,3,4,5	0:0:2
11	Measure Fore Bearing and back bearing of a closed traverse of 3 sides (Irregular Triangle) and correct the bearings and included angles for the local attraction.	3	1,2,34	2,3,4,5	0:0:2
12	Measure Fore Bearing and back bearing of a closed traverse of 4 sides (Irregular Quadrilaterals) and correct the bearings and included angles for the local attraction.	3	1,2,34	2,3,4,5	0:0:2
13	Measure distance between two survey stations using compass when two stations are inaccessible.	3	1,2,34	2,3,4	0:0:2
14	Undertake Survey Project with chain and compass for closed traverse for minimum 5 sides around a building.(Compulsory)	3	1,2,34	2,3,4,5	0:0:2
15	Plot the traverse on a drawing sheet for data collected in the Survey Project mentioned at practical No.15.	3	1,2,34	3	0:0:2
16	Perform setting and temporary adjustments of Dumpy level/Auto level	4	1,2,34	2,3,4	0:0:2
17	Take level of various points and recording it in a level book	4	1,2,34	2,3,4	0:0:2
18	Undertake simple leveling and using dumpy level/ Auto level and leveling staff.	4	1,2,34	2,3,4	0:0:2
19	Undertake differential leveling and determine Reduced Levels by Height of instrument method and Rise and fall method using dumpy level/Auto Level and leveling staff.	4	1,2,34	2,3,4,5	0:0:2
20	Undertake fly leveling with double check using dumpy level/Auto level and leveling staff to establish a Temporary BM.	4	1,2,34	2,3,4,5	0:0:2
21	Find RL of given point by taking Inverted Staff Reading	4	1,2,34	2,3,4,5	0:0:2
22	Undertake Profile leveling and cross-sectioning for a given road length and interval.	4	1,2,34	2,3,4,5	0:0:2
23		4	1,2,34	2,3,4,5	0:0:2

24	Undertake Survey Project with Leveling instrument for Profile leveling and cross-sectioning for a road length of 500 m with cross-section at 30 m interval. (Compulsory).	4	1,2,34	2,3,4,5	0:0:2
25	Plot the L-section with minimum 3 cross-sections on A1 size drawing sheet for data collected in Survey Project mentioned at practical No.23 & 24	4	1,2,34	3	0:0:2
26		4	1,2,34	3	0:0:2
				Total Hours	**0:0:52=52**

5.MAPPING OF CO's WITH PO's

CO's	Course Outcome	PO Mapped	Experiment Linked	Cognitive Level R/U/A
CO1	Perform conversion of measuring units.	PO1,PO7	1,2	U,A
CO2	Identify different surveying instruments, tools and their applications.	PO1,PO2,PO3,PO4	3 TO 26	A
CO3	Handle survey instruments, taking measurements, computation and interpretation.	PO1,PO2,PO3,PO4	3 TO 26	A
CO4	Carryout different types of chain, tape, compass, leveling surveying tasks.	PO1,PO2,PO3,PO4	3 TO 26	A
CO5	Identify errors and apply corrections suitably.	PO1,PO2,PO3	9,10,11,12,14,19, 20,21,22,23,24	A

Course	CO's	Programme Outcomes (PO's)						
		1	2	3	4	5	6	7
BASIC SURVEYING	CO1	3	0	0	0	0	0	3
	CO2	3	3	3	3	0	0	0
	CO3	3	3	3	3	0	0	0
	CO4	3	3	3	3	0	0	0
	CO5	3	3	3	0	0	0	0

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped

SUGGESTED SPECIFICATION TABLE FOR CIE QUESTION PAPER DESIGN:

Sl No	Unit Title	Teaching Hours	Distribution of theory Marks			
			R	U	A	Total Marks
1	Introduction	02	02	-	-	02
2	Chain Survey	05	-	-	04	04
3	Compass Survey	08	-	-	06	06
4	Leveling	11	-	-	08	08
	TOTAL	26	02	00	18	20

6. SUGGESTED LEARNING RESOURCES:

1. Surveying and Levelling volume I-Kanetkar, T. P.; Kulkarni, S. V. -Pune Vidyarthi Gruh Prakashan,Pune; ISBN:978-81-858-2511-3
2. Surveying and Levelling-Basak, N. N. -McGraw Hill Education, New Delhi ISBN 93-3290-153-8
3. Surveying-Saikia, M D.; Das. B.M.; Das. M.M. -PHI Learning, New Delhi ISBN: 978-81-203-3985-9
4. Fundamentals of Surveying and Levelling-Subramanian, R. -Oxford University Press.Delhi, ISBN: 0-19-945472-8
5. Survey I -Duggal, S. K. -McGraw Hill Education, New Delhi, ISBN: 978-00-701-5137-6
6. Textbook of Surveying-Rao, P. Venugopala Akella, Vijayalakshmi -PHI Learning, New Delhi ISBN: 978-81-203-4991-9
7. Surveying I-Punmia, B.C,Jain, Ashok Kumar Jain, Arun Kumar-Laxmi Publications., New Delhi. ISBN: 8-17-008853-4
8. Surveying and Levelling, Volume 1 -Bhavikatti, S. S. -I. K. International, New Delhi ISBN: 978-81-906-9420-9
9. Textbook of Surveying-Venkatramaiah, C -Universities Press.New Delhi ISBN: 978-81-737-1021-6

SOFTWARE/LEARNING WEBSITES

Sl NO	PARTICULARS/CONTENT	E-LINKS/E-CONTENT	LAUGUAGE
1	Classification of surveying	https://www.youtube.com/watch?v=-JgCfsooiu0	English
2	Chain Surveying(Theory)	https://www.youtube.com/watch?v=itB45jrCPp0	English

3	Survey Stations	https://www.youtube.com/watch?v=RXARsCjBNlU	Hindi
4	Direct Ranging	https://www.youtube.com/watch?v=x8FaSZCPbM8	English
5	Indirect Ranging	https://www.youtube.com/watch?v=6oIyMP2iO5s	English
6	Chain Triangulation	https://www.youtube.com/watch?v=wbd-Ib2xc0Y	English
7	Chain Triangulation	https://www.youtube.com/watch?v=J7wiM6X5qt4	English
8	Basic Construction of Regular polygon	https://www.youtube.com/watch?v=TAHczLeIUTc	Graphical
9	Obstacles occur in chain survey-obstacle to Ranging	https://www.youtube.com/watch?v=-hzoS5CQsJw	English
10	Measuring Horizontal Distance by the Direct Method: Chaining on Sloping Grounds	https://www.youtube.com/watch?v=dwNHZbZ40AQ	English
11	Errors and correction in chain surveying	https://www.youtube.com/watch?v=GOL8e3JaS7U	English
12	Types of Cross Staff	https://www.youtube.com/watch?v=w0OBpHLQv7w	English
13	Block Cross Staff	https://www.youtube.com/watch?v=Ik7wKksW11k	English
14	Perpendicular offset and oblique offset, some guidelines- Chain Surveying	https://www.youtube.com/watch?v=SLB6d4RHgMw	English/Hindi
15	Parts of Prismatic Compass	https://www.youtube.com/watch?v=-kDpvQop__k	English
16	Difference b/w surveyor & prismatic compass	https://www.youtube.com/watch?v=5DsCSxKkGws	English
17	Whole circle bearing & Quadrantal bearing	https://www.youtube.com/watch?v=iLQYLoc4ja4	English
18	Conducting a CLOSED TRAVERSE(Irregular polygon) in surveying	https://www.youtube.com/watch?v=pGS2YX30nI8	English
19	Open traverse	https://www.youtube.com/watch?v=6NA3Y79Pf38	English
20	Closing error in surveying and it's correction	https://www.youtube.com/watch?v=Ww7EcE3w_x4	English
21	Local attraction and its correction	https://www.youtube.com/watch?v=2EYQDwcizcE	English

22	Auto Level	https://www.youtube.com/watch?v=j8poe2vvD2Q	English
23	Temporary adjustment of a dumpy level	https://www.youtube.com/watch?v=V95S5drWU6M	English
24	How to read leveling staff	https://www.youtube.com/watch?v=7L3jaOvhoZk	English
25	Differential Levelling	https://www.youtube.com/watch?v=rY4XIgSueUs	English
26	Inverted Leveling	https://www.youtube.com/watch?v=xKfb6wOeoc4	English
27	Steps involved in field data entry and cross staff survey for estimation of area	https://www.youtube.com/watch?v=RThEISUJBXg	English
28	How to Shift Dumpy Level	https://www.youtube.com/watch?v=jIxCx0oSWOY	English
29	Reciprocal leveling	https://www.youtube.com/watch?v=bru-lpQtodg	English
30	Fly leveling	https://www.youtube.com/watch?v=_SiSn_tcXZA	English
31	Profile leveling	https://www.youtube.com/watch?v=dOxlLPET77U	English
32	Profile leveling	http://www.engr.mun.ca/~sitotaw/Site/Fall2007_files/Lab4_Lecture4_Prof_leveling.pdf	PDF
33	Measuring Horizontal Distance by the Indirect Method: Using the Clinometer	https://www.youtube.com/watch?v=Dm1NtRiFgYo	English
34	Surveying & Leveling	http://ecoursesonline.iasri.res.in/course/view.php?id=523	E-Content
35	Surveying & Leveling	http://ecoursesonline.iasri.res.in/course/view.php?id=36	E-Content

7. SUGGESTED LIST OF STUDENT ACTIVITIES

Note: the following activities or similar activities for assessing CIE (IA) for 10 marks (Any one)

5) Each student should conduct different activities compulsorily.

1	Visit any construction site and make a report on different types of conventional and modern surveying equipment used.
2	Collect the information of survey instruments available in the market with specifications.
3	Perform reconnaissance survey for alignment of road.
4	Determine the RLs of the existing structures like lintels, chajja, slab, and beam.

8.COURSE ASSESSMENT AND EVALUATION CHART

Sl NO	Assessment	Duration	Max Marks	Conversion
1.	CIE Assessment 1 (Written Test -1-theory) - At the end of 3rd week	60 minutes	20	Average of two written tests 20 marks
2.	CIE Assessment 2 (Written Test -2-theory) - At the end of 13thweek	60 minutes	20	
3.	CIE Assessment 3 (Skill test) - At the end of 5th week	3 Hrs	20	Average of three skill tests 20 marks
4.	CIE Assessment 4 (Skill test) - At the end of 7th week	3 Hrs	20	
5.	CIE Assessment 5 (Skill test) - At the end of 9th week	3 Hrs	20	
6.	CIE Assessment 6 (Student activity)- At the end of 11th week	-	20	20 marks
7.	Total Continuous Internal Evaluation (CIE) Assessment			60 marks
8.	Semester End Examination(SEE) Assessment (Practical Test)	3 Hrs	100	40 marks
			Total Marks	**100 marks**

9. RUBRICS FOR SKILL TEST / PRACTICAL TEST (Both CIE & SEE) EVALUATION

Sl No	Parameter to be Observed	Marks Allotted
1	Safety measures	10
2	Setting and operation	25
3	Preparation of experimental set up	10
4	Observations and Recording	25
5	Interpretation of result and Conclusion	20
6	Viva	10
	Total	**100**

	Unsatisfactory	Developing	Satisfactory	Good	Exemplary	Student Score
10.MODEL RUBRICS FOR ACTIVITY (10marks)(CAN BE MODIFIED)						
Dimension	4	8	12	16	20	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	16
Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	12
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	16
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	16
Average / Total Marks: (16+12+16+16)/4						15 marks

11.MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED:

Sl No	Equipment Name	No
1.	Metric Chain made from galvanized mild steel wires 4mm in dia, brass handles with swivel joints, brass tallies provided at every 5 m length of chain - 20 and 30m.	05
2.	Metallic tape-, Steel tape, Invar satisfying IS 1269 (Part 1 and Part 2) : 1997 specifications	05
3.	Pegs of length 400 mm and c/s area of 50 mm x 50 mm.	50
4.	Arrows 400 mm long and made up of good quality hardened and tempered steel wire of 4 mm in diameter.	50
5.	Metallic Ranging rods of 2 m length, circular or octagonal in cross section of 30 mm diameter, Lower shoe of 150 mm long. Painted in black, white and red stripes of 200 mm each.	50
6.	Line ranger, optical square confirming to IS: 7999 – 1973specifications	50
7.	Open cross staff consisting of 4 metal arms with vertical slits for sighting through.	05
	Surveyor compass.	05
8.	Prismatic compass confirming to IS 1957-1961 with stand, made in Gunmetal material having diameter of 85-110 mm and the least count of 30minutes.	05
9.	Dumpy level confirming to IS: 9613 – 1986 with stand and internal focusing telescope of standard make.	05
10.	Automatic levels confirming to IS: 9613 – 1986 with stand and internal focusing telescope of standard make.	05
11.	EDM and	05
12.	Rodometre	05

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Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

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Course Code	20EE01P	Semester	I/II
Course Title	**FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING**	Course Group	Core
No. of Credits	4	Type of Course	Lecture & Practice
Course Category	PC	Total Contact Hours	6Hrs Per Week
			78Hrs Per Semester
Prerequisites	Basic Science	Teaching Scheme	(L:T:P)= 1:0:2
CIE Marks	60	SEE Marks	40

1. RATIONALE

Fundamentals of Electrical and Electronics Engineering is essential for all streams of diploma engineering to work in any industry as it covers basic electrical safety,troubleshooting and repairing of simple electrical systems. Basic knowledge of electrical wiring circuits, protective devices, electrical machines and basic electronics devices is required to work in any engineering field.

2. COURSE SKILL SET

The aim of the course is to help the student to attain the following industry identified competency through various teaching –learning experiences
1. Perform and test domestic wiring
2. Can operate electrical machine
3. Test different electronics devices

3. INSTRUCTIONAL STRATEGY

1. Expose to different learning tools used in respective labs, Operational safety and Procedure to be followed in the laboratory.
2. Instructor should give examples from daily routine as well as, engineering/technology applications on various concepts and principles in each topic so that students are able to understand and grasp these concepts and principles. In all contents, SI units should be followed.
3. Activity- Theory - Demonstrate/practice approach may be followed throughout the course so that learning may be skill and employability based.

4.COURSE OUT COMES

On successful completion of the course, the students will be able to

CO1	Comply with the safety procedures
CO2	Apply the fundamentals of electricity.
CO3	Install and test electrical wiring system.

CO4	Identify and Operate electrical machines, Batteries and UPS.
CO5	Identify and test the different electronic devices.

5. COURSE TOPICS:

Unit No	Unit Name	Hours
1	Electrical Safety	6
2	Electrical Fundamentals	15
3	Protective Devices and Wiring circuits	15
4	Electric Machines and Batteries and UPS	15
5	Introduction to Electronic Devices and Digital Electronics	27
	Total	**78Hr**

6. COURSE CONTENT

The following topics/sub topics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

Sl No	Unit skill set (In cognitive domain) *On successful completion of the class, the students will be able to*	Topics/Sub topics	Practical	Hours L-T-P
		UNIT-1 **Electrical Safety**		
1	Comply with the Electrical safety	1. Electrical Symbols 2. Electrical safety • Identify Various types of safety signs and what they mean • Demonstrate and practice use of PPE • Demonstrate how to free a person from electrocution • Administer appropriate first aid to victims, bandaging, heart attack, CPR, etc. • Fire safety, causes and precautionary activities. • Use of appropriate fire extinguishers on different types of fires. • Demonstrate rescue techniques applied during fire hazard, correct method to move injured people during emergency • Inform relevant authority about any abnormal situation • Earthing: Types	1. Electrical symbols related to electrical engineering. 2. Electrical safety 3. Electrical earthing	02-00-04

		➢ http://nreeder.com/Flash/symbols.htm ➢ http://bouteloup.pierre.free.fr/iufm/as/de/house/safety.html		
		UNIT-2 **Electrical Fundamentals**		
2	1. Identify and select the different measuring devices. 2. Identify different electrical supply systems 3. Identify open circuit, close circuit and short circuit conditions.	1. Describe the sources of electrical energy. 2. Electrical current, voltage, emf, potential difference, resistance with their SI units. 3. Mention the meters used to measure different electrical quantities. Identification Measuring devices • Ammeter • Voltmeter • Wattmeter • Ohmmeter • Digital Multimeter • Megger • Tong tester 4. Explain supply systems like AC, DC. ➢ http://nreeder.com/Flash/units.htm	1. Connect voltmeter and ammeter in a simple circuit. (Practicing of identification and connection of different meters)	1:0:2
3	Calculate basic electrical quantities	• Relationship between V, I and R. (Ohms law) • Behavior of V, I in Series and Parallel DC circuits. • Describe open circuit, close circuit and short circuit • http://nreeder.com/Flash/ohmsLaw.htm	1. Measure current, voltage and analyze effective resistance in seriescircuit 2. Demonstrate effects of shorts and opens in a circuit	1:0:2
4	Connect resistances in different combination	1. Equation to find the effective Resistances connected in series 2. Equation to find effective Resistances connected in parallel 3. Resistances connected series and parallel combinations 4. Simple problems.	1. Determine the equivalent Resistance of parallel connected resistances.	1:0:2
5	Calculate and measurement of different parameters of an AC quantity.	**Ac sinewave:** **S**inusoidal voltage, current, amplitude, time-period, cycle, frequency, phase, phase difference, and their units. ➢ http://nreeder.com/Flash/freqPeriod.htm ➢ http://nreeder.com/Flash/oscill	Generate and demonstrate the measurement of frequency, time period and phase difference of AC quantity using CRO and function generator.	1:0:2

		oscope.htm		
6	1. Calculate and measure electric power and energy 2. Identify and differentiate Single phase and Three phase supply	1. Electrical work, power and power factor • SI units • Mention the meters used to measure them ➤ http://nreeder.com/Flash/powerLaw.htm	• Measure the voltage, current, powerusing relevant measuring instruments in a Single-phase load.	1:0:2
7.		1. Electrical energy • SI units • Mention the meters used to measure them 2. Single phase and Three phase supply.	1. Measure single phase energy using relevant measuring instruments in a Single-phase load. 2. Measure the voltages in Three phase supply.	
		UNIT-3 **Protective Devices and Wiring circuits**		
8.	1. Identify and select Protective Devices for given current and voltage rating 2. Identify and select the various electrician tools	• Necessity of Protective Devices • Various Protective devices and their functions • fuse wire, • Glass cartridge fuse • HRC fuse • Kit-kat fuse • MCB • MCCB • RCCB • ELCB • Relay • Different types of electrician tools and their function. • Describe various wiring tools. • State procedure of care and maintenance of wiring tools.	1. Wire up and test PVC Conduit wiring to control one lamp from two different places using suitable protective devices.	1:0:2

9	1. Identify and select Wiring systems for a given applications 2. Identify and select the cables used for different current and voltage ratings. 3. Draw the wiring diagram	1. Describe different types of wiring systems. • Surface conduit • concealed conduit • PVC casing capping 2. Wiring systems and their applications. 3. Describe the types of wires, cables used for different current and voltage ratings.	1. Wire up and test PVC Conduit wiring to control of 2 sockets and 2 lamps.	2:0:4
10	Estimate and plan electrical wiring	Explain Plan and estimate the cost of electrical wiring for one 3m × 3m room consisting of 2 lamps, 1ceiling fan, 2 three pin sockets.	Prepare the estimation and plan	1:0:2
	UNIT-4 **Electrical Machines and Batteries and UPS**			
11	1. Identify the types of transformer. 2. verify the transformation ratio.	**Transformer** • working principle • Transformation ratio • Types and applications with their ratings	Connect the Single- phase transformer as Step-Up, Step-Down transformer and verify the transformation ratio.	1:0:2
12	1. Start and run the induction motor. 2. Troubleshoot DOL/Star-delta starter and induction motor	1. **Induction motor** • Single phase and three phase Induction motor. • Necessity of starters. • Describe DOL AND STAR-DELTA starters. 2. What are different causes and remedies for a failure of starter and induction motor.	1. Construct a suitable circuit to start and reverse the direction of three phase induction motor using DOL/ Star-delta starter. 2. Troubleshoot the DOL/ Star-delta starter and induction motor	2:0:4
13	Select and test the battery for a given application	**Battery** • Types of batteries (Lead acid battery, lithium, sealed maintenance free (SMF) battery, Modular battery). • Selection criteria of batteries for different applications. • Ampere-Hour Capacity. • Efficiency	Testing Condition of charging and discharging of a Lead-acid battery	1:0:2
14	Select the size of the UPS for a given application	**UPS** • List the types and applications • Selection criteria of UPS • Sizing of UPS	Sizing of UPS	1:0:2

		UNIT-5 **Introduction to Electronic Devices and Digital Electronics**		
15	Identify and differentiate Conductors, insulators and semiconductors.	1.Compare Conductors, insulators and semiconductors with examples. 2. Identification of types and values of resistors-color codes. ➢ http://nreeder.com/Flash/resistor.htm	Determine the value of resistance by color code and compare it with multimeter readings.	1:0:2
16	Identify and test PN junction Diode	**PN junction diode** • Symbol • Characteristics • Diode as switch. • Types of diodes and ratings • Applications	Identify the terminals of a Diode and test the diode for its condition.	1:0:2
17	Build and test bridge rectifier circuit	**Rectifier** • Need for AC to DC conversion • Bridge rectifier with and without C filter, • Rectifier IC.	Construct and test bridge rectifiers using semi-conductor diode and rectifier IC. Compare the waveforms using CRO.	1:0:2
18	1. Identify and test Transistor 2. Build and test transistor as an electronic switch	**Transistor (BJT)** • Symbol • Structure • Working principle	1. Identification of transistor terminals and test. 2. Construct and test the transistor as an electronic switch	1:0:2
19.	1. Identify and test different digital IC 1.	• Comparison of analog and digital signal • Digital systems, examples. • Binary numbers, Boolean identities and laws. • Digital system building blocks: Basic logic gates, symbols and truth tables. IC-Definition and advantages.	• Test a Digital IC. • Identification and selection of suitable ICs for basic gates. 1. Verify NOT, AND, OR, NOR, EXOR and NAND gate operations (two inputs).	2:0:4
20	Identify and test various Sensors and actuators.	**1.Sensors** • Concept • Types: Temperature, Pressure, Water, Light, Sound, Smoke, proximity Sensors, Flow, humidity, voltage, vibration, IR (Principle/working, ratings/ specifications, cost, and applications) **2.Actuators** • Concept • Types and applications. • Relay as an actuator.	2. Connect and test an IR proximity sensor to a Digital circuit. • Connect and test a relay circuit using an Opto-coupler. (Photo Diode & Transistor) **Refer note**	2:0:4

21	Know the application of Microcontroller and PLC	• Microcontroller as a programmable device, and list of real-world applications. • PLC and Their applications. (Activity based learning)	• Identify different application microcontroller. • Identify commercially available PLC and their specifications	1:0:2
			TOTAL	26-0-52=78 Hours

7. PRATICAL SKILL EXERCISES

Sl. No.	Practical Out Comes/Practical exercises	Unit No.	PO	CO	L: T:P Hrs.
1	• Identify Various types of safety signs and what they meanDemonstrate and practice use of PPE • Demonstrate how to free a person from electrocution appropriate first aid to victims, bandaging, heart attack, CPR, etc. • Fire safety, causes and precautionary activities. • Use of appropriate fire extinguishers on different types of fires. • Demonstrate rescue techniques applied during fire hazard. • Inform relevant authority about any abnormal situation during fire hazard.	1	1,4	1	0:0:2
2	• Demonstrate different types of earthing/using videos. • Prepare a Report on types of Earthing	1	1,4	1	0:0:2
3	Connect voltmeter and ammeter in a simple circuit. (Practicing of identification and connection of different meters)	2	1,4	2	0:0:2
4	1.Determine the equivalent Resistance of series connected resistances. 2.Demonstrate effects of shorts and opens in a circuit	2	1,4	2	0:0:2
5	Determine the equivalent Resistance of parallel connected resistances.	2	1,4	2	0:0:2
6	Generate and demonstrate the measurement of frequency, time period and phase difference of AC quantity using CRO and function generator.	2	1,4	2	0:0:2
7	Measure the voltage, current, power using relevant measuring instruments in a Single-phase load.	2	1,4	2	0:0:2
8.	1.Measure single phase energy using relevant measuring instruments in a Single-phase load.				

	2. Measure the voltages in Three phase supply.				
9.	Wire up and test PVC Conduit wiring to control one lamp from two different places using suitable protective devices.	3	1,4	3	0:0:2
10	2. Wire up and test PVC Conduit wiring to control of 2 sockets and 2 lamps.	3	1,4	3	0:0:2
11	Wire up and test PVC Conduit wiring to control one lamp from two different places.	3	1,4	3	0:0:2
12	Plan and estimate the cost of electrical wiring for one 3mx3m room consisting of 2 CFL 1ceiling fan, 2 three pin sockets.	3	1,4	3	0:0:2
13	Connect the Single- phase transformer as Step-Up, Step-Down transformer and verify the transformation ratio.	4	1,4	4	0:0:2
14	Construct a suitable circuit to start and reverse the direction of three phase induction motor using DOL/star-delta starter.	4	1,4	4	0:0:2
15	Troubleshoot the DOL/Star-delta starter and induction motor	4	1,4	4	0:0:2
16	Testing Condition of charging and discharging of a Lead-acid battery.	4	1,4	4	0:0:2
17	Estimate the UPS rating for a computer lab with 50 computers/domestic.	4	1,4	4	0:0:2
18	Determine the value of resistance by color code and compare it with multimeter readings	5	1,4	5	0:0:2
19	Identify the terminals of a Diode and test the diode for its condition.	5	1,4	5	0:0:2
20	Construct and test bridge rectifiers using semiconductor diode and rectifier IC. Compare the waveforms using CRO.	5	1,4	5	0:0:2
21	Identification of transistor terminals and test. Construct and test the transistor as an electronic switch.	5	1,4	5	0:0:2
22	Test an IC. Verify the truth-table AND, OR, NOT logic gates.				
23	Verify the truth-table NAND, NOR, EX-OR, EX-NOR logic gates.	5	1,4	5	0:0:2
24	Connect and test anIR proximity sensor to a Digital circuit. **NOTE:**Any sensor listed in the theory may be used for condition appropriately.				
25	Connect and test a relay circuit using an Optocoupler. (Photo Diode & Transistor)	5	1,4	5	0:0:2
26	1.Identify MCS-51 variants 2.Identify commercially available PLC and their specifications.	5	1,4	5	0:0:2
Total					**0:0:52 =52Hrs**

8.MAPPING OF CO WITH PO

CO	Course Outcome	PO Mapped	Experiment	Cognitive Level R/U/A	Lecture & Practical Sessions in Hrs	TOTAL
CO1	Comply with the safety procedures	PO1, PO4	1-2	A	6	
CO2	Apply the fundamentals of electricity.	PO1, PO4	3-7	A	15	
CO3	Install and test electrical wiring system and protective devices.	PO1, PO4	8-12	A	15	
CO4	Identify and Operate electrical machines, Batteries and UPS.	PO1, PO4	13-17	A	15	
CO5	Identify and test the different electronic devices.	PO1, PO4	18-26	A	27	

Course	CO's	Programme Outcomes (PO's)						
		1	2	3	4	5	6	7
Fundamentals of Electrical and Electronics Engineering	CO1	3	0	0	3	0	0	0
	CO2	3	0	0	3	0	0	0
	CO3	3	0	0	3	0	0	0
	CO4	3	0	0	3	0	0	0
Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped								

9. SUGGESTED LEARNING RESOURCES:

Reference Books:
1. ABC of Electrical Engineering by B. L. Theraja and A. K. Theraja, S Chand Publishers, New Delhi, 2014 Edition.
2. Basic Electrical and Electronics Engineering by S. K. Bhattacharya, Pearson Education India, 2012 Edition.
3. Electronic Devices and Circuits by I. J. Nagrath, PHI Learning Pvt. Ltd., 2007 Edition.
4. Basic Electrical Engineering byV. Mittle and ArvindMittle, McGrawHill Companies, 2005 Edition.
5. The 8051 Microcontroller & Embedded systemsusinkbnnnjbbh bb vvvvg assembly and C (2ndEdition)–M.A.Mazidi , J.C. Mazidi&R.D.McKinlay ISBN: 81-317-1026-2
6. Programmable Logic controllers, W BOLTON

e-Resources
1. https://www.youtube.com/watch?v=mc979OhitAg&list=PLWv9VM947MKi_7yJ0_FCfzTBXpQU-Qd3K
2.https://www.youtube.com/watch?v=CWulQ1ZSE3c
3. en.wikipedia.org/wiki/Transformer
2. www.animations.physics.unsw.edu.au//jw/AC.html
3. www.alpharubicon.com/altenergy/understandingAC.htm
4. www.electronics-tutorials

5. learn.sparkfun.com/tutorials/transistors
6. www.pitt.edu/~qiw4/Academic/ME2082/Transistor%20Basics.pdf
7. www.technologystudent.com/elec1/transis1.htm
8. www.learningaboutelectronics.com
9. www.electrical4u.com
10. https://www.youtube.com/watch?v=zLW_7TPf310
11. https://www.youtube.com/watch?v=8PTNjw-hQIM

10. SUGGESTED LIST OF STUDENTS ACTIVITYS for CIE

Note: the following activities or similar activities for assessing CIE (IA) (Any one)
Each student should conduct different activity and no repeating should occur

1	Using suitable meters/ instruments give the practical working circuits to measure
2	Resistance, Current, Voltage, Power and Energy in DC and AC (Single phase) Circuits.
3	List out the different types of wiring systems used in your laboratories or house with their representation.
4	Mini-Projects: Like preparing extension box, switch box and wiring models,
5	List out the different protective devices used in your laboratories or house with their ratings.
6	Applications of Electro Magnetic Induction, statically induced and dynamically induced emf, self and mutual induced emfs.
7	Prepare a report on types of starters and enclosures used for various industrial applications of AC motors.
8	Types of Cells and Battery maintenance
9	Visit nearby Battery charging shop or show room and prepare a report of the visit.
10	Prepare a report on various types of diodes used for various industrial applications.
11	Prepare a report on various types of sensors and actuators used for various industrial applications.
12	Mini-Projects: Connect and test a sensor (domain application) to a Digital circuit

11. COURSE ASSESSMENT AND EVALUATION CHART

Sl.No	Assessment	Duration	Max marks	Conversion	
1.	CIE Assessment 1 (Written Test -1-theory) - At the end of **3rd week**	60 minutes	20	Average of two written tests 20	
2.	CIE Assessment 2 (Written Test -2-theory) - At the end of **13th week**	60 minutes	20		
3.	CIE Assessment 3 (Skill test) - At the end of **5th week**	3 Hours	100	20	Average of three skill tests 20
4	CIE Assessment 4 (Skill test) - At the end of **7th week**	3 Hours	100		
5	CIE Assessment 5 (Skill test) - At the end of **9th week**	3 Hours	100		
6	CIE Assessment 6 (Student activity) - At the end of **11th week**	-	20	20	

7.	Total Continuous Internal Evaluation (CIE) Assessment			60
8.	Semester End Examination (SEE) Assessment (Practical Test)	3 Hours	100	40
Total Marks				**100**

Note:
1. CIE written test is conducted for 20 marks (Two sections). Each section shall have two full questions of same CL, CO. Student shall answer one full question (10 marks) from each section.
2. CIE Skill test is conducted for 100 marks (3 Hours duration) as per scheme of evaluation and the obtained marks are scaled down to 20 marks

12. SCHEME OF VALUATION FOR SKILL TEST (CIE) & SEE

(CONTINOUS INTERNAL & SEMESTER END EXAMINATION)

Sl. No.	Particulars	Marks
1.	Identification of meters/ equipment/wires/tools etc.	10
2.	Writing Circuit/writing diagram and Procedure*	25
3.	Conduction	35
4.	Results	10
5	Viva-voce	20
Total		**100**

12. RUBRICS FOR ACTIVITY

RUBRICS FOR ACTIVITY (Example only) Faculty need to develop appropriate rubrics for respective activity						
Dimension	**Beginning**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1	**2**	**3**	**4**	**5**	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	
Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	

Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	
					Average / Total Marks:	

Lab Equipment Requirement

The following are the specification of the apparatus required for FEEE lab and number of apparatus required for the batch of 20 students.

Sl. No.	Name of Equipment and Specification	Quantity Required
1	Dual Channel 30 V, 2 A continuously variable DC Regulated Power Supply with Current and Overload Protection	05 Nos.
2	+/- 15 V, 2 A, fixed DC Regulated Power Supply	05 Nos.
3	Portable Moving Coil DC Voltmeters a) 0 - 1 V b) 0 - 10 V c) 0 - 30 V	Each 05 Nos.
4	Portable Moving Iron AC Voltmeters a) 0 - 300 V b) 0 - 600 V	Each 05 Nos.
5	Portable Moving Coil DC Ammeters a) 0 - 100 mA b) 0 - 1 A c) 0 - 2 A	Each 05 Nos.
6	Portable Moving Iron AC Ammeters a) 0 - 2 A b) 0 - 5 A c) 0 - 10 A	Each 05 Nos.
7	Watt-meters a) 150/ 300V, 2 A, UPF b) 300/ 600 V, 5/ 10 A, LPF	Each 02 Nos.
8	Rheostats – 25 Ohms, 50 Ohms, 150 Ohms, 220 Ohms (all rated at 3 A)	Each 05 Nos.
9	Rheostat Loads s – 1 KW, 230 V	02 Nos.

10	Wire wound Resistors- 5 Ohms 2 Watts, 25 Ohms 5 Watts, 330 Ohms 2 Watts, 560 Ohms 2 Watts, etc.	Each 05 Nos.
11	Soldering Iron 60 W	05 Nos.
13	Single Phase Energy meter 10 A, 230 V, 50 Hz, Digital type	05 Nos.
14	Multi-meter Digital ¾"	06 Nos.
15	Duel Trace Oscilloscope – 30 MHz	02 Nos.
16	Three Phase Induction Motors :1 HP – 440 V 50 Hz,2 HP – 440 V 50 Hz.	Each 02 Nos.
17	Three phase DOL, Star-Delta, Auto transformer starter	Each 02 Nos.
18	UPS 1 KVA	01 Nos.
19	Battery Lead-Acid type, 140 A-hr and Hydrometers	02 Nos.

Sl. No.		Name of Equipment and Specification	Quantity Required
20		I C Trainer kit	05 Nos
21		Digital IC's 7400, 7402, 7404, 7408, 7486 etc	Each 10 Nos.
22		Wooden Wiring board (2x3) ft	10
23		Wiring accessories	
	2	a) PVC conduit - ¾" - 10 lengths b) Cap and casing - ¾" - 10 lengths c) Switches Single Pole- 5A, 230 V d) Switches two way – 5 A, 230 V e) 3 Pin Sockets 5A, 230 V f) Bulb Holders – 5 A, 230 V g) 3 Pin Plug 5A, 230 V h) 60 Watts Lamps i) 100 Watts Lamps j) 15 W CFL lamps k) Copper Wires of sizes 1.5 mm², 2.5 mm², 4 mm² – 1 coil each l) Gang boxes (1+1, 2+1, 2+2) m) Kit –Kat fuses 5A, 15 A n) MCB 16 A & 32 A/ 230 V, Single and Double Pole o) ELCB 16 A & 32 A/ 230 V, Double Pole p) Neutral link- 16 A, 230 V q) Screws of assorted sizes r) Testers	Each 10 Nos.

24		Electronic Components a) Diodes - BY 127 and IN 4001 b) Zener Diodes – 6.2 V, 5.6 V, 7.8 V c) Relays – solid state Sugar cube type, SPST, Coil 6V, Power circuit 230 V, 5 A. d) Spring Boards e) Bread Boards f) Tag Boards.	Each 10 Nos.
25		Simple PANEL BOARD/ CUBICAL consisting of bus-bars, CB/MCB/ELCB, meters, HRC fuses, magnetic contactors, cables, earthing points.	1 No

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Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

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Course Code	20KA21T	Semester	II
Course Title	ಸಾಹಿತ್ಯ ಸಿಂಚನ – I ಬಳಕೆ ಕನ್ನಡ - I	**Course Group**	AU
No. of Credits	2	**Type of Course**	Lecture
Course Category	PC	**Total Contact Hours**	2Hrs Per Week 26Hrs Per Semester
Prerequisites		**Teaching Scheme**	(L:T:P)= 2:0:0
CIE Marks	50	**SEE Marks**	Nil

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ಸಾಹಿತ್ಯ ಸಿಂಚನ – I

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	ಪಠ್ಯಕ್ರಮ	ಬೋಧನಾ ಅವಧಿ
1	ಕರ್ನಾಟಕದ ಸಂಕ್ಷಿಪ್ತ ಇತಿಹಾಸ ಮತ್ತು ಸಾಹಿತ್ಯದ ಬೆಳವಣಿಗೆ	01 ಗಂಟೆ
2	ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಪೂರ್ವ ಪೀಠಿಕೆ	01 ಗಂಟೆ
3	ಹಳೆಗನ್ನಡ ಸಾಹಿತ್ಯ - ಪಂಪ ಪೂರ್ವ ಯುಗದ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ರಚನೆಗೆ ಪ್ರಮುಖ ಪ್ರೇರಣೆಗಳು ಮತ್ತು ಪ್ರಭಾವಗಳು ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಂಪರೆ ಮತ್ತು ರಾಜಾಶ್ರಯ ಪಂಪ ಪೂರ್ವ ಯುಗದ ಕವಿಗಳು - ಕವಿರಾಜಮಾರ್ಗ ಮತ್ತು ವಡ್ಡಾರಾಧನೆ	03 ಗಂಟೆ
4	ಪಂಪ (ಚಂಪೂ) ಯುಗದ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಮತ್ತು ಪರಂಪರೆ ಆದಿಕವಿ ಪಂಪ, ರನ್ನ, ಪೊನ್ನ ಮತ್ತು ಜನ್ನ. ಒಂದನೇ ನಾಗವರ್ಮ ಮತ್ತು ನಾಗಚಂದ್ರ 10 ಮತ್ತು 11ನೇ ಶತಮಾನದ ಸಮಕಾಲೀನ ಪ್ರಮುಖ ಕವಿಗಳು	04 ಗಂಟೆ
5	ನಡುಗನ್ನಡ ಸಾಹಿತ್ಯ - ವಚನ ಸಾಹಿತ್ಯ (ಬಸವ ಯುಗ) ವಚನ ಸಾಹಿತ್ಯದ ಬೆಳವಣಿಗೆಗೆ ಕಾರಣಗಳು ಮತ್ತು ಪ್ರಮುಖ ರೂಪರೇಷೆಗಳು ಪ್ರಮುಖ ವಚನಕಾರರುಗಳು ವಚನ ಸಾಹಿತ್ಯದಲ್ಲಿ ವೈಚಾರಿಕತೆ ಮತ್ತು ಕಾಯಕ ತತ್ವ	04 ಗಂಟೆ
6	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ರೂಪಗಳು ಷಟ್ಪದಿ - ಕುಮಾರವ್ಯಾಸ ಮತ್ತು ಲಕ್ಷ್ಮೀಶ, ರಾಘವಾಂಕ ಮತ್ತು ರಗಳೆ - ಹರಿಹರ ಸಾಂಗತ್ಯ - ರತ್ನಾಕರವರ್ಣಿ , ಕೇಶಿರಾಜ - ಶಬ್ದಮಣಿದರ್ಪಣಂ	04 ಗಂಟೆ
7	ದಾಸ ಸಾಹಿತ್ಯ ಮತ್ತು ಕೀರ್ತನೆಗಳು ಪುರಂದರದಾಸರು, ಕನಕದಾಸರು ಮತ್ತು ಕೀರ್ತನೆಕಾರಾರುಗಳು	02 ಗಂಟೆ
8	ತ್ರಿಪದಿ - ಸರ್ವಜ್ಞ, ಜಾನಪದ ಸಾಹಿತ್ಯ ಮತ್ತು ತತ್ವಪದಗಳು - ಸಂತ ಶಿಶುನಾಳ ಶರೀಫರು	04 ಗಂಟೆ
9	ಹೆಳವನಕಟ್ಟೆ ಗಿರಿಯಮ್ಮ ಮತ್ತು ಸಂಚಿಹೊನ್ನಮ್ಮ, ಕೆಂಪುನಾರಾಯಣ ಮತ್ತು ಮುದ್ದಣ	02 ಗಂಟೆ

10	ಹಳೆಗನ್ನಡ ಮತ್ತು ನಡುಗನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಒಂದು ಅವಲೋಕನ	01 ಗಂಟೆ
	ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ **26 ಗಂಟೆಗಳು**	**26 ಗಂಟೆ**

ಬಳಕೆ ಕನ್ನಡ - I [balake Kannada - Kannada for Usage]

Table of Contents (ಪರಿವಿಡಿ)

Part – 1	Teaching Hour
Necessity of learning a local language, Tips to learn the language with easy methods. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation. Instructions to Teachers for Listening and Speaking Activities.	02 Hour
Part – II	
Key to Transcription for Correct Pronunciation of Kannada Language, Instructions to Teachers to teach Kannada Language	02 Hour
Part – III Lessons to teach Kannada Language - Listening and Speaking Activities	
Lesson – 1 Personal Pronouns, Possessive Forms, Interrogative words	02 Hour
Lesson – 2 Possessive forms of nouns, debitive question and Relative nouns	02 Hour
Lesson – 3 Qualitative, Quantitative and Colour Adjectives, Numerals	02 Hour
Lesson – 4 Predictive Forms, Locative Case	02 Hour
Lesson – 5 Dative Cases and Numerals	02 Hour
Lesson – 6 Ordinal numerals and Plural markers	02 Hour
Lesson – 7 Defective / Negative Verbs and Colour Adjectives	02 Hour
Lesson – 8 Permission, Commands, encouraging and Urging words (Imperative words and sentences)	02 Hour
Lesson – 9 Accusative Cases and Potential Forms used in General Communication	02 Hour
Lesson – 10 Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs	02 Hour
Lesson – 11 Do's and Don'ts in Learning of Kannada Language (Any Language in General)	01 Hour
Lesson – 12 Kannada Vocabulary List : ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು	01 Hour
Kannada Words in Conversation **Total Teaching Hours**	**26 Hours**