



**Government of Karnataka
DEPARTMENT OF TECHNICAL EDUCATION**

Curriculum Structure

II Semester Scheme of Studies

Sl. No.	Teaching Department	Course Code	Course Name	Hours per week			Total Contact Hours/week	Credits	CIE Marks		Theory SEE Marks		Practice SEE Marks		Total Marks
				L	T	P			Max	Min	Max	Min	Max	Min	
Integrated Courses															
1	SC	25SC21I	Engineering Mathematics-II	4	0	4	8	6	50	20	50	20	-	-	100
2	EE	25EE01I	Fundamentals of Electrical & Electronics Engineering	3	0	4	7	5	50	20	-	-	50	20	100
3	CE	25CE21I	Civil Engineering Graphics and CAD	3	0	4	7	5	50	20	-	-	50	20	100
4	CE	25CE22I	Basic Surveying	4	0	4	8	6	50	20	50	20	-	-	100
Audit Course															
5	CE	25CE23T	Indian Constitution	2	0	0	2	2	50	20	-	-	-	-	50
6	Personality Development		NCC/NSS/YOGA/SPORTS...	Students are expected to engage in any one of these activities from 1 st semester to 6 th semester (No Credits)											
Total				16	0	16	32	24	250	-	100	-	100	-	450



Government of Karnataka
DEPARTMENT OF TECHNICAL EDUCATION

Program	CIVIL ENGINEERING	Semester	II
Course Name	CIVIL ENGINEERING GRAPHICS AND CAD	Type of Course	Integrated
Course Code	25CE21I	Contact Hours	91 hours/ Sem. 7 Hrs. / Week
Teaching Scheme	L: P::3: 4	Credits	5
CIE Marks	50	SEE Marks	50 (Practice)

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

1. Rationale:

The studying civil Engineering Graphics at this level aims at helping the learner to familiarize the language of engineers to communicate ideas and instructions often needed in "On-job engineering situations". For this in order to convey concepts and instructions and to strengthen the associated mathematical principles, develop accuracy and speed when using drawing tools, become proficient in drafting, and familiarize oneself with Indian engineering drawing standards. Graphics tries to assist the student in becoming acquainted with the technical vocabulary used in industry to enhance one's capacity for creativity, vision, and analysis using digital technology i.e computer-aided design (CAD) software. Graphics enhance problem-solving abilities and critical thinking skills by analyzing and resolving design issues and discrepancies in engineering drawings. It helps students to understand the ethical and professional responsibilities associated with engineering drawing, including accuracy, confidentiality, and adherence to relevant standards and regulations.

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

CO-01	Draw the basic geometrical figures as per drawing standards.
CO-02	Draw the orthographic projections of 2D and 3D objects.
CO-03	Draft the different building components using drafting software
CO-04	Develop three-dimensional view using both manual and digital technology.

3. Course Content

WEEK	CO	PO	Theory (3 Hours per week)	Practice (4 Hours per week)
1	CO1	1,2,4	INTRODUCTION TO ENGINEERING DRAWING AND DRAWING INSTRUMENTS	DIMENSIONING

WEEK	CO	PO	Theory (3 Hours per week)	Practice (4 Hours per week)
			Introduction to Engineering drawing. ➤ Drawing Instruments. ➤ Standard Sizes of A2 drawing sheets using Drafter, Layout of A2 drawing sheets using Drafter (Margin and Title block), Folding of A2 drawing sheets. Use of Drafter. ➤ Types of lines and their applications, Conventions used in Civil Engineering. ➤ SI UNITS for linear and area measurements. Conversion into mm, cm, deci, mt, deco, hecto & Km., Sq. mm, Sq.cm, Sq.m, Hectare, Sq. Km.	➤ Introduction to Dimensioning. ➤ Elements of Dimensioning. ➤ Dimensioning of common features - Diameters, radii, arcs, chords and simple Civil Engineering Objects ➤ Systems of Dimensioning. (Aligned and Uni-directional) ➤ Methods of arrangements of Dimensioning – Chain Dimensioning, parallel dimensioning, Progressive dimensioning
2	CO1, CO3*	1,2,4	SCALE and DIMENSIONING PRACTICE ➤ Representative Fraction and Scales recommended by the Bureau of Indian Standards. ○ Reducing scale ○ Enlarging scale and ○ Full scale Examples for each scale for dimensioning sketches.	CADD Introduction to CAD ➤ General features of CAD, CAD work station, Hardware and Software requirements. ➤ Advantages of using CAD, Starting CAD, Understanding CAD. Editor Screen- title bar, pull down menu bars, dashboard, standard tool bar, drawing area, UCS, command prompt area, status bar. Demonstration of DRAW and MODIFY commands in CAD using short cut keys. ➤ Commands- Command Entry Options using -Command Line, Menus (File Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help) and Dialog Boxes. ➤ Using a wizard, using a template, starting from scratch. ➤ Setting up of limits, Object snap, Units,
			GEOMETRIC CONSTRUCTIONS POLYGONS & CONIC SECTIONS ➤ Construction of polygons by interior angle method. ➤ Applications of Ellipse and Parabola in engineering constructions. ➤ Construction of Ellipse by Concentric Circle method. ➤ Construction of Parabola by	CADD CADD Basic Entities- Drawing Line, Arc, Circle, Rectangle and polygons, Ellipse using different coordinate Systems such as ➤ Absolute Cartesian Coordinates, ➤ Relative Cartesian Coordinates, ➤ Absolute Polar coordinates, Relative Polar Coordinates ➤ Direct distance entry and line
3	CO1, CO3*	1,2,4		

WEEK	CO	PO	Theory (3 Hours per week)	Practice (4 Hours per week)
			Rectangle method.	command, picking coordinates on the screen and line command.
4	CO2, CO3*	1,2,4	ORTHOGRAPHIC PROJECTION OF POINTS	CADD
			➤ 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.	Practice atleast Ten exercises which covers draw and modify commands. (Note: Exercise shall be designed by course Co-ordinator)
5	CO2, CO3*	1,2,4	➤ Practicing exercises on projection of points in all four quadrants.	➤ Hatch, Dimensioning, Dimension Style, Point and Point Style and Text style – Multi Line Text, Single Line Text Commands. ➤ Complete the above exercises with hatch, dimensioning and text.
6	CO2, CO3*	1,2,4	ORTHOGRAPHIC PROJECTION OF LINES	Draw 2D drawings of the following Building Components and plot with scale.
			➤ Projection of lines - Line Parallel to both HP and VP. ➤ Line parallel to one plane and Perpendicular to other. ➤ Practicing of exercises on projection of lines in different positioning.	➤ Draw front elevation and sectional plan for door frame indicating the position of fixing the frame and section of the post indicating the rebate and shutter thickness. for given sketch (Construction line, Match property COMMANDS)
7	CO2, CO3*	1,2,3,4	ORTHOGRAPHIC PROJECTION OF LINES (Contd..)	DRAW 2D
			➤ Line parallel to VP and Inclined to the HP. ➤ Practicing of exercises on projection of lines in different positioning.	➤ Draw to a suitable scale the plan elevation and vertical section of a six paneled double leaf door for given sketch (Construction line, Match property COMMANDS)
8	CO2, CO3*	1,2,3,4	ORTHOGRAPHIC PROJECTION OF PLANES (ONLY TWO POSITIONS)	DRAW 2D
			Projection of Plane surface: ➤ Parallel to HP and perpendicular to VP planes of projection. ➤ Perpendicular to VP and inclined to HP planes of projection. ➤ Practicing of exercises on projection of planes in different positioning (edge and corner only)	➤ Draw to a suitable scale the front elevation sectional elevation and sectional plan for a teak wood 1) Fully glazed window 2) Six Panelled window one-third of glazed and two third of raised Panelled for given sketch (Construction line, Match property, Change property COMMANDS)

WEEK	CO	PO	Theory (3 Hours per week)	Practice (4 Hours per week)
9	CO2, CO3*	1,2, 3,4	ORTHOGRAPHIC PROJECTION OF PLANES (Contd...)	DRAW 2D
			➤ Practicing of exercises on projection of planes in different positioning (edge and corner only).	➤ Draw 2D drawings of the for the given sketch 1) Cross section through wall (upto footing) 2) Sectional elevation of wall through door. 3) Sectional elevation of wall through window.
10	CO2, CO3*	2, 3,4,7	ORTHOGRAPHIC PROJECTION OF SOLIDS (ONLY TWO POSITIONS)	DRAW 2D
			Introduction-Positioning of solids: ➤ Solid lying with base on HP. ➤ Solids lying with base or axis inclined to HP only. ➤ Practicing of exercises on projection of solids in different positioning. (edge and corner only). (Solids like- Pentagonal / hexagonal Prism, Triangular Pyramids and Cone)	➤ Draw 2D drawings of the for given sketch- Dog legged stair case Plan and elevation. ➤ Model space, Paper space, Print, Plot Style Manager, viewport
11	CO4	1,2,4	DEVELOP ISOMETRIC DRAWINGS OF SIMPLE OBJECTS (MANUAL & CAD)	
			➤ Principles of isometric Views ➤ Isometric and Non-Isometric Lines. ➤ Exercises on isometric views- Cube, Prism, Pyramids, Cone, Cylinder & combination of solids.	➤ Exercises on isometric views- Cube, Prism, Pyramids, Cone, Cylinder & combination of solids.
12	CO4	1,2,4	➤ Exercises on isometric views (Conversion of Orthographic projection to Isometric view)	➤ Exercises on isometric views (Conversion of Orthographic projection to Isometric view)
13	CO4	1,2,4,7		➤ Examples – Brick with frog impression, One and One & half Brick thick English and Flemish bonds, Steps, Column with footing.

*Linked to practice

4. References:

1. K.R.Gopalakrishna "Fundamentals of Drawing" Subhas Publications, 2010.
2. Bureau of Indian Standards. Engineering Drawing Practice for Schools and Colleges IS: Sp-46. BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2
3. K.R.Gopalakrishna "Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.
4. M. Chakraborti "Civil engineering drawing" Bhaktivedanta book trust.
5. Bhatt, N. D. Engineering Drawing. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93- 80358-17-8.
6. R.K. Dhawan, "A text book of Engineering Drawing", S.Chand Publishers, Delhi, 2010.
7. G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
8. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private

Limited, 2008.

9. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
10. Dhananjay A. Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGrawHill Publishing Company Limited, 2008.
11. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
12. IS 962 (1989) Code of practice for Architectural and Building Drawings
13. CAD in Civil Engineering a Laboratory Referrel- Dr M.A. Jayaram, D.S. Rajendra Prasad, Sapna Book House
14. Autodesk. AutoCAD User Guide. Autodesk Press, USA, 2015.
15. Sham, Tickoo. AutoCAD 2016 for Engineers and Designers. Dreamtech Press; Galgotia Publication, New Delhi, 2015; ISBN 978-93511991
16. Software/Learning Websites
 - a) <https://www.youtube.com/watch?v=TJ4jGyD-WCw>
 - b) https://www.youtube.com/watch?v=dmt6_n7Sgcg
 - c) <https://www.youtube.com/watch?v=MQScnLXL0M>
 - d) <https://www.youtube.com/watch?v=3WXPanCq9LI>
 - e) <https://www.youtube.com/watch?v=fvjk7PlxAuo>
 - f) <https://www.youtube.com/watch?v=a3WFm8Yffm4>
 - g) <https://www.youtube.com/watch?v=z4xZmBpXlzQ>
 - h) <https://www.youtube.com/watch?v=uojn7SOHPBw>
 - i) <https://www.youtube.com/watch?v=w2-aEzO4-Q>
 - j) <https://www.youtube.com/results?searchquery=dimensioning>
 - k) <https://www.youtube.com/watch?v=rt7qTvPYVXE>
 - l) <https://www.youtube.com/results?searchquery=conic+sections+in+engineering+drawing>
 - m) <https://www.youtube.com/watch?v=SB83cUaAiCM>
 - n) <https://www.youtube.com/watch?v=fK4h5gM73w8&list=PLlhUrsYr8yHxEkIv8yOatn3Dcr6KYK3j>
 - o) <https://www.youtube.com/watch?v=FtugLo9DMw8&list=PLlhUrsYr8yHxFkG5tGWXaNbIXvCibQvV>
 - p) <https://www.youtube.com/watch?v=AoNI0xnxDO0&list=PLlhUrsYr8yHx7TVB51jN3HZVyW3R6RiBg>
 - q) <https://www.youtube.com/watch?v=YV4RZNQ2yB8&list=PLlhUrsYr8yHxARPzEFz1nXgt8j6xFtEm>
 - r) <https://www.youtube.com/watch?v=Vo9LC9d7FQA&list=PLlhUrsYr8yHxVky7bfrnbRcdXchjTK83>
 - s) <https://www.youtube.com/watch?v=f1HdtfiAWk>
 - t) <https://www.youtube.com/watch?v=It2jXzsXrVw&list=PLrOFa8sDv6jd0R3IzKolrYadMkwsDG2g>
 - u) <http://www.CADDmark.com/>
 - v) <http://www.CADDtutorials.net/>
 - w) <https://www.youtube.com/watch?v=J2LiXosRKKk>
 - x) <https://www.youtube.com/watch?v=8rkkYc8mFck>

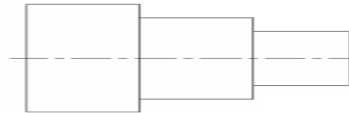
5. CIE Assessment Methodologies

Sl.No	CIE Assessment	Test Week	Duration (minutes)	Max marks	
1.	CIE-1 Theory Test	4	90	50	Average of all CIE=50 Marks
2.	CIE-2 Practice Test	7	180	50	
3	CIE-3 Theory Test	10	90	50	
4.	CIE-4 Practice Test	13	180	50	
5	CIE-5 Portfolio evaluation of all the activities through Rubrics	1-13		50	
Total					50 Marks

6. SEE – Practice Assessment Methodologies

Sl. No	SEE – Practice Assessment	Duration (minutes)	Max marks	Min marks to pass
1.	Semester End Examination-Practice	180	50	20

7. CIE-1 Theory Test

Program		Civil Engineering		Semester II		
Course Name		Civil Engineering graphics		Test	I	
Course Code		25CE21I	Duration	120 min	Marks	50
Name of the Course Coordinator:						
Note: Answer any one full question from each section. Each full question carries equal marks.						
Q. No	Questions		Cognitive Level	Course Outcome	Marks	
Section - I						
1	a) Mention the different type of lines and its applications with neat sketch (10 marks) b) Copy the given sketch to 1:1 scale and dimension adopting aligned system with progressive dimensioning method. (15marks) 		R/U Ap	C01	25	
2	a) Mention the different sizes of drawing sheet and board (10marks) b) Copy the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method. (15 marks) 		R/U Ap	C01		
Section - II						
3	a) An ellipse shaped tunnel which has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method. (15 marks) b) 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. (10marks)		AP U	C01 C02	25	
4	a) Inscribe parabolic arch by rectangle method of side 120mm and 80mm. (15 marks) b) 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. (10 marks)		AP U	C01 C02		
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in eachsection carry the same weightage of marks, cognitive level and course outcomes.						

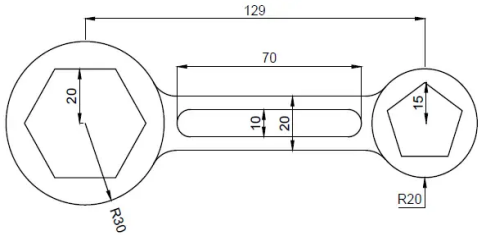
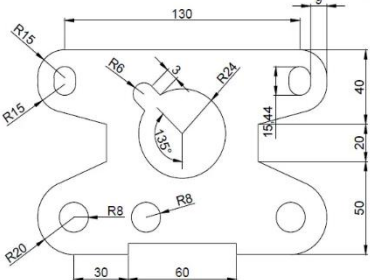
Signature of the Course Coordinator Signature of the HOD Signature of the IQAC Chairman

7.CIE-3 Theory Test

Program	Civil Engineering			Semester II	
Course Name	Civil Engineering Graphics			Test	III
Course Code	25CE21I	Duration	120 min	Marks	50
Name of the Course Coordinator:					
Note: Answer any one full question from each section. Each full question carries equal marks.					
Q. No	Questions		Cognitive Level	Course Outcome	Marks
Section - 1					
1	a) The length of a line is 100 mm long and is inclined at 45° to VP and parallel to HP. The line is 15 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. b) 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.		U/Ap	CO2	25
2	a) 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. b) 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.		U/Ap	CO2	
Section - 2					
3	a) 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. Draw the top and front views of the lamina. b) A square lamina of 40mm sides rests with one of its corner on HP. Lamina appears to be inclined at 35° to HP. Draw its projections.		U/Ap	CO2	25
4	a) A cube of 50 mm long edges is so placed on HP on one corner that a body diagonal is Parallel to HP and perpendicular to VP. Draw it's projections. b) 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. Draw the top view and the front views of the prism.		U/Ap	CO2	
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in eachsection carry the same weightage of marks, cognitive level and course outcomes.					

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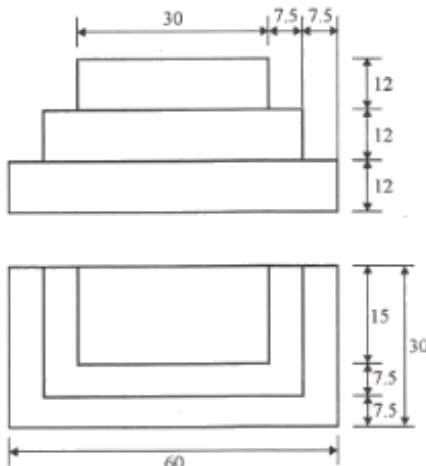
7. CIE - 2 Practice Test

Program	Civil Engineering			Sem	II
CourseName	Civil Engineering graphics			Test	II
Course Code	25CE21I	Duration	180 min	Marks	50
Name of the Course Coordinator:					
Note: Answer one question from each part.					
Questions				CO	Marks
PART -A Draft the given figure using appropriate commands a)  OR b) 				C03	50
PART -B a) Draw to a suitable scale the plan elevation and vertical section of a given sketch of 6 paneled double leaf door. OR b) Draw front elevation and sectional plan for given sketch of door frame indicating the position of fixing the frame and section of the post indicating the rebate and shutter thickness					
Scheme of assessment a) Drafting using appropriate commands (25 marks) b) Applying Text, Hatch commands etc. (10 marks) c) Applying Dimensioning. (10 marks) d) Plotting with scale. (5 marks)					
Total Marks					50

Signature of the Course Coordinator

Signature of the HOD

7. CIE - 4 Practice Test

Program	Civil Engineering			Sem	II
CourseName	Civil Engineering graphics			Test	IV
Course Code	25CE21I	Duration	180 min	Marks	50
Name of the Course Coordinator:					
Note: Answer one question from each part.					
Questions				CO	Marks
PART -A				CO3/ CO4	50
1) Draw to a suitable scale the front elevation, sectional elevation and sectional plan for given sketch of a Teak Wood Fully glazed window or 2) Draw to a suitable scale the sectional elevation for a given sketch of Cross section through wall .					
PART -B					
1) A square pyramid of base edge 50 mm and height 80 mm Draw the isometric view of the solid in CAD or 2) Draw the isometric view of the following objects whose orthographic views are given below:				CO3/ CO4	50
					
Scheme of assessment					
a) Drafting using appropriate commands (25 marks)					
b) Applying Text, Hatch etc. (10 marks)					
c) Applying Dimensioning. (10 marks)					
d) Plotting with scale. (5 marks)					
Total Marks				50	

Signature of the Course Coordinator

Signature of the HOD

CIE-5 Portfolio evaluation of all the graded exercises

S.NO	Name of Exercises	B	I	G	A	E	S
Note: B- Beginner, I- Intermediate, G- Good, A- Advanced, E- Expert, S- Student Score							
Manual drawings (prepare all exercise in A2/A3 drawing sheets using Mini-drafter)							
E1.	Conventional representation of different types of lines and convention used in civil engineering drawing (List of lines & conventions + one drawing which includes all types of lines)						
E2.	Simple figures with scales and dimensioning styles using Tee / drafter . (prepare 4 minimum exercise in drawing sheets)						
E3.	Horizontal, Vertical, 30 degrees, 45 degrees, 60 and 75 degrees' lines using Tee and Set squares/ drafter . conic sections (prepare 2+2 minimum exercise in drawing sheets)						
E4.	Orthographic projections of points. (prepare 8 minimum exercise in drawing sheets)						
E5.	Orthographic projections using first angle method of projection having lines. (prepare 8 minimum exercise in drawing sheets)						
E6.	Orthographic projections using first angle method of projection having planes. (prepare 10 minimum exercise in drawing sheets)						
E7.	Orthographic projections using first angle method of projection having solids. (prepare 8 minimum exercise in drawing sheets)						
E8.	Isometric view of simple objects - Cube, Prism, Pyramids, Cone Cylinder, Brick with frog impression, One and One & half Brick thick English and Flemish bonds, Steps, Column with footing.						
CAD drawings (Print out should be a part of portfolio assessment)							
E9	Basic 2D entities like minimum 10 Exercises problems which covers draw modify commands, text, dimension and hatch) in software						
E10	Front elevation and sectional plan for door frame						
E11	Plan elevation and vertical section of a 6 paneled double leaf door.						
E12	Front elevation sectional elevation and sectional plan for a teak wood - Fully glazed window						
E13	Front elevation sectional elevation and sectional plan for a teak wood - 6 paneled window one-third of glazed and two third of raised paneled						
E14	Cross section through wall, through door, window						
E15	Dog legged stair case Plan and elevation.						
E16	Isometric view of simple objects - Cube, Prism, Pyramids, Cone Cylinder, Brick with frog impression, One and One & half Brick thick English and Flemish bonds, Steps, Column with footing.						
Average							

8. Suggestive Activities:

The List is only shared as an Example and not inclusive of all possible activities of the course. Student and Faculty are encouraged to choose activities that are relevant to the topic and on the availability of such resources at their institution. (Atleast one activity for each Course Outcome)

Sl. No.	Suggestive Activities
01	Collect four topographic maps discuss about the scale mentioned in it write a note about the scales used in each map.
02	Making a model of a plane, solid, or other object, then holding it between two perpendicular planes i.e. walls and the floor, torch light in front of it so that the object's shadow appears on the wall and floor. Next, trace the object or take a picture, then compile the information into a report that is no longer than two pages. Each student should choose different objects
03	Create a model of cross section through wall or Column with footing
04	Problem based Learning: Given the isometric views of at least two objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views.

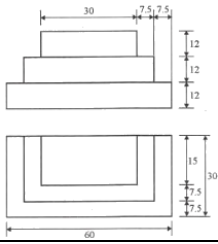
9. Rubrics for Assessment of Graded Exercises (Qualitative Assessment)

Sl. No	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Students Score (Example)
		10	20	30	40	50	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	20
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	30
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	40
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	50
	Average Marks= (20+30+40+50)/4=35(Example)						35

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

10. SEE- Model Practice Question Paper

Program	Civil Engineering		Semester	II
CourseName	Civil Engineering graphics	Course Code : 24CE21I	Duration	180 min
Questions			CO	Marks
Note: Answer one question from each part.				
PART -A a) Draw to a suitable scale the plan elevation and vertical section of a given sketch of 6 paneled double leaf door. OR b) Draw front elevation and sectional plan for given sketch of door frame indicating the position of fixing the frame and section of the post indicating the rebate and shutter thickness			C03	20

PART -B 1) A square pyramid of base edge 50 mm and height 80 mm Draw the isometric view of the solid in CAD or 2) Draw the isometric view of the following objects whose orthographic views are given below: 	C04	20
Scheme of assessment a) Drafting using appropriate commands (10+10 marks) b) Applying Text, Hatch etc. (5+5marks) c) Applying Dimensioning. (5+5 marks) d) Plotting with scale. (5 marks) e) Suggestive Activities (5 marks) Note : Practical examiners should assess mentioned suggested activities those are engaged during course.		
Total Marks		50

1)Signature of the Examiner

2) Signature of the Examiner

11. Equipment/software list with Specification for a batch of 30 students

Sl. No.	Particulars	Specification	Quantity
01	Prototype Solid models	The model Prototype engineering graphics is made of acrylic material it's a mandatory subject study model 3d to understand the front view, side view, top view as well as sectional view. advanced set of solids including cube, cylinder, cone, triangular prism, square pyramid, triangular pyramid, sphere, hemisphere, rectangular prism, pentagonal pyramid, pentagonal prism, hexagonal prism and all truncated, sectional models with edges and axis in each model. size: (l)31 x (h)15 cm	1set
02	Computers	(At least One Computer per student in practical session.)- Latest Configuration which can be able to run latest any Computer Aided Drafting Software.	30
03	Computer Aided Drafting Software	Open source software	(30 user licenses)
04	Printer	All in one (Print, Scan, Copy) Multifunction laser printer with A4/ A3 size printing Compatible with window 7 and later Printer output mono with Bluetooth, USB, Ethernet, Wi-Fi, Wifi direct connectivity Duplex printing with LCD display	01
05	LCD Projector	WXGA Resolution, White and Colour Light Output at 3,500 lumens, Dual Screen Interactivity, Finger Touch Interactive, Ultra Short Throw 80" 47cm, 10,000 Hours Lamp Life in Eco Mode, Multi-PC Projection, 3 x HDMI	01
06	Drawing Table with chair in drawing room	Overall Size: - 1525 x 610 x 760 mm (H) Structure size: - 1500 x 585 x 730mm (H) Structure made of 25 x 25mm mild steel square pipe. Dimension of plastic seat: 37 x 38.5 cm	60



**Government of Karnataka
DEPARTMENT OF TECHNICAL EDUCATION**

Program	CIVIL ENGINEERING	Semester	II
Course Name	BASIC SURVEYING	Type of Course	Integrated
Course Code	25CE22I	Contact Hours	104 Hrs. /Sem. 8 Hrs./Week
Teaching Scheme	L:P :: 4:4	Credits	06
CIE Marks	50	SEE Marks	50 (Theory)

1. Rationale:

Development and planning of any civil engineering projects needs survey of that area to be carried out and various types of survey maps are to be prepared. These maps and drawings are used for taking various decisions regarding the planning, designing, estimation, execution and construction process. The students should therefore know the various methods and information to handle and operate the needed survey instruments. This course is therefore one of the core courses required for civil, mining, environmental and transportation engineers. Students are advised to master the desired skills which are expected from them for survey related works.

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

CO-01	Identify and select suitable surveying instruments for a given/different situation.
CO-02	Perform basics of chain survey in getting linear measurements of the ground and finding area.
CO-03	Perform compass surveying for determine the relative positions of the existing features on the ground.
CO-04	Perform various types of levelling operations in determining the relative elevation of ground.
CO-05	Apply surveying techniques for preparing contour maps to understand ground profile.

3. Course Content

WEEK	CO	PO	Theory (4 hours per week)	Practice (4 hours per week)
1	1	1,6	Introduction to Surveying 1. Definition, Objectives, and purposes of surveying. 2. Primary divisions of surveying: Plane and geodetic surveying. Detailed classifications of surveying. 3 & 4. Principles of Surveying. Units of measurements (Linear and angular). Care and adjustments of instruments.	1. Problems on units of measurement. 2. Effective communication and signs used in survey practice.

2	1,2	1,6	Chain surveying 1.Chain survey Instruments: Metric Chain, engineer's chain, Guntur chain, revenue chain. 2.Tapes- steel tape, fiber tape, Arrow, Ranging rod, Open cross staff and wooden cross staff. 3.Ranging: Direct Ranging (I. By naked Eye II. using Line Ranger) and Indirect or reciprocal ranging. 4.Chaining on flat ground and Chaining on sloping ground-by stepping method only.	3. Undertake ranging between two points in the field by naked eye and by using line ranger, measure the distance. 4 Undertake reciprocal ranging and measure the distance between two stations using tape or chain.
3	1,2	2,6	1.Chain triangulation: Chain survey Station, Base line, check line, Tie line, Offset, Tie station. Selection of survey stations. 2.Location of ground features, Types of offsets: a. Perpendicular and Oblique. b. short and long offsets. 3.Instruments for setting right angles – Cross staff, Optical square, prism square. 4.Obstacles - obstacles in chaining, ranging and both ;simple problems	5. Set out perpendicular to a chain line from a point i. on it. ii. Outside it. 6. Range and find the distance between two station points where there is an obstacle to chaining.
4	1,2	2,6	1 & 2. Cross staff surveying. numerical problems on area calculation 3. Errors in length: Instrumental error, personal error, error due to natural cause, random error- No numerical problems. 4.Conventional Signs, Recording of measurements in a field book.	7. Range and find the distance between two station points where there is an obstacle to both chaining and ranging. 8. Find the area of the land shown to you in field by cross staff survey.
5	1,3	1,2,6	1.Technical Terms: Bearings-True, Magnetic and Arbitrary bearing. Geographic/True, Magnetic and Arbitrary Meridians. 2. Components of Prismatic Compass and their Functions, Method of using Prismatic Compass- temporary adjustments and observing bearings. 3. Introduction to Surveyor compass, Systems of Bearing-Whole circle bearing system and Reduced Bearing System 4. Problems on conversion of given bearing to another (from one to another)	8. Measure Fore Bearing and Back Bearing of survey lines using Prismatic Compass.
6	1,3	1,2,6	1 & 2. Calculation of interior and exterior angles from bearings (For both WCB & RB systems) 3. Magnetic dip and declination: simple problems on declination. 4. Compass traversing: Open and Closed traversing	9. Measure Fore Bearing and back bearing of a closed traverse of 3 sides and calculate the included angles.

7	1,3	1,2,6	1. Compass traversing: Open and Closed traversing, Local attraction, sources of local attraction. 2 & 3. Detection of local attraction, Numerical problems on local attraction 4. Plotting a traverse and finding closing errors, errors in compass: Instrumental, Personal and natural cause.	10. Measure Fore Bearing and back bearing of a closed traverse of 5 sides and correct the bearings and included angles for the local attraction if any. Plot the traverse on paper and find the area.
8	1,4	1,2,6	Introduction to levelling. 1. Terminologies: Level surfaces, Datum, Bench Marks- GTS, Permanent, Arbitrary and Temporary. Mean sea level, Instruments used for levelling: 2. Types of levels: Dumpy, Auto level, Digital level, Components of Dumpy Level and its fundamental axes, Levelling staff: Telescopic staff. 3 & 4. Temporary adjustments of Level, Technical terms - Reduced Level, Rise, Fall, Line of collimation, Station, Back sight, Fore sight, intermediate sight, Change point, Height of instrument.	11. Undertake simple leveling using dumpy level/Auto level and find the elevation of the ground by Height of instrument method. 12. Undertake simple leveling using dumpy level/Auto level and find the elevation of the ground by Rise and fall method.
9	1,4	1,2,6	1 & 2-Types of Leveling: Simple levelling- Procedure, Numerical problems. Booking and reduction of levels - H.I, Rise and Fall Methods with necessary checks. 3 & 4-Differential levelling- Procedure, field book entry and numerical problems. Booking and reduction of levels - H.I, Rise and Fall Methods with necessary checks.	13. Undertake differential leveling using dumpy level/Auto level and determine Reduced Levels by Height of instrument method. 14. Undertake differential leveling using dumpy level/Auto level and determine Reduced Levels by Rise and fall method.
10	1,4	1,2,6	1 & 2- Fly levelling- Procedure, Numerical problems. Booking and reduction of levels - H.I, Rise and Fall Methods with necessary checks. 3 & 4- Profile Levelling Procedure, field book entry and numerical problems. Booking and reduction of levels - H.I, Rise and Fall Methods with necessary checks.	15. Undertake fly leveling with double check using dumpy level/Auto level and leveling staff to establish a Temporary BM. 16. Find RL of given point by taking Inverted Staff Reading.
11	1,4	1,2,6	1, 2 & 3. Numerical problems on levelling. 4. Reciprocal levelling , Errors in Leveling.	17. Undertake Profile leveling and cross-sectioning for a given road length and interval. Plot the Longitudinal sectioning and cross sectioning of the ground.
12	1,4,5	1,2,6	1 & 2. Contours, Importance of contours, characteristics of contour, Factors affecting contour interval. 3 & 4. Methods of locating contour – direct method	18. Undertake Profile leveling for a road length , fix formulation level and find depth of cut/fill.

13	1,4,5	1,2,6	1 & 2. Methods of locating contour – indirect method – by squares 3. Interpolation of contour – by arithmetic calculation, 4. Uses of contours maps, Tracing of Contour Gradients and Location of Route	19. Conduct block contouring for 20 m x 20 m to draw its contour plan at a suitable contour interval.

4. References:

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

5. CIE Assessment Methodologies

Sl.No	CIE Assessment	Test Week	Duration (minutes)	Max marks	Average of all CIE=50 Marks
1.	CIE-1TheoryTest	4	90	50	
2.	CIE-2Practice Test	7	180	50	
3	CIE-3TheoryTest	10	90	50	
4.	CIE-4Practice Test	13	180	50	
5	CIE-5 Portfolio evaluation of all the activities through Rubrics	1-13		50	
Total					50 Marks

6. SEE - Theory Assessment Methodologies

Sl. No	SEE - Theory Assessment	Duration	Exam Paper Max marks	Exam Paper Max Marks scale down to (Conversion)	Min marks to pass
1.	Semester End Examination-Theory	3 Hours	100	50	20

7. CIE Theory Test model question paper

Program		Civil Engineering			Semester -II	
Course Name		Basic Surveying			Test	I
Course Code		25CE22I	Duration	90 min	Marks	50
Name of the Course Coordinator:						
Note: Answer any one full question from each section. Each full question carries equal marks.						
Q.No	Questions			Cognitive Level	Course Outcome	Marks
Section - 1						
1	a) State the objectives of surveying?			R	CO-1	05
	b) Distinguish between plane and geodetic surveying?			R	CO-1	05
	c) Explain metric chain with the neat sketch?			R	CO-2	05
	b) Define the following with neat sketch. (i) Chain survey Station (ii) Base line (iii) Check line (iv) Tie line (v) Offset.			U	CO-2	10
2	a) State the purpose of surveying			R	CO-1	05
	b) Write the classification of surveying			R	CO-1	05
	c) Explain the procedure of ranging between two point using line ranger?			U	CO-2	05
	d) A survey line BAC crosses a river, A and C being on the near and distant banks respectively. Standing at D, a point 50 meters measured perpendicularly to AB from A, the bearings of C and B are 320° and 230°respectively, AB being 25 meters. Find the width of the river.			U	CO-2	10
Section - 2						
3	a) What are offsets? List and explain different types of offsets?			U	CO-2	05
	b) How do you measure the distance between two points on a sloping ground by indirect method?			U	CO-2	05
	c)What are the instruments used to set right angles to survey line? Explain procedure for anyone?			R	CO-2	05
	d)How to establish a survey center line in mountain terrain?			Ap	CO-2	10
4	a) List different types of errors in length and explain one?			U	CO-2	05
	b) What are the precautions to be taken while entering in field book.			U	CO-2	05
	c) Write the purpose of chain surveying			R	CO-2	05

	d) Plot the following cross staff survey of a field ABCDEFG and calculate its area.			Ap	CO-2	10
		750	D			
		650	210 E			
	C 180	490				
		300	250 F			
	B 160	180				
		100	50 G			
		0	A			
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, cognitive level and course outcomes.						

Signature of the Course Coordinator Signature of the HOD Signature of the IQAC Chairman

7. CIE Practice Test model question paper

7. CE Practice Test model question paper					
Program	Civil Engineering			Semester	II
Course Name	Basic Surveying			Test	II
Course Code	25CE22I	Duration	180 min	Marks	50
Name of the Course Coordinator:					
Questions				CO	Marks
1. Two numerical problems on measurement of units and conversion.				1	05
2. Conduction of an experiment on Chain surveying or				2	20
3. Conduction of an experiment on Cross staff surveying.					
4. Conduction of an experiment on compass surveying.				3	20
Scheme of assessment for Question No 2 and 3. Writing procedure and tabulation- 05M Setting and Conduction – 05M Observation recording – 05M Results and conclusion – 05M Total – 20M					
5. Viva-voce					05
Total Marks					50

Signature of the Course Coordinator

Signature of the HOD

7. CIE Theory Test model question paper

Program	Civil Engineering			Semester - II	
Course Name	Basic Surveying			Test	III
Course Code	25CE22I	Duration	90 min	Marks	50
Name of the Course Coordinator:					
Note: Answer any one full question from each section. Each full question carries equal marks.					

Q. No	Questions	Cognitive Level	Course Outcome	Marks																		
Section - 1																						
1	a) Explain the following. (i) True bearing (ii) Magnetic bearing (iii) Arbitrary bearing (iv) Magnetic meridian (v) Arbitrary meridian.	U	CO-3	10																		
	b) Distinguish whole circle bearing system and reduced bearing system?	U	CO-3	05																		
	c) A closed traverse is conducted in anti-clockwise direction with five stations A,B,C,D and E in the form of a regular pentagon. If the fore bearing of AB is 45°00', find the fore bearings of other sides?	An	CO-3	10																		
2	a) List and Explain any FIVE functional parts of prismatic compass?	U	CO-3	10																		
	b) Explain magnetic dip and declination.	U	CO-3	05																		
	b) The following bearings were observed with compass. Calculate the interior angles.	An	CO-3	10																		
	<table><tr><th>Line</th><th>Fore Bearing</th><th>Back Bearing</th></tr><tr><td>AB</td><td>60° 30'</td><td>240° 30'</td></tr><tr><td>BC</td><td>122° 0'</td><td>302° 0'</td></tr><tr><td>CD</td><td>46° 0'</td><td>226° 0'</td></tr><tr><td>DE</td><td>205° 30'</td><td>25° 30'</td></tr><tr><td>EA</td><td>300° 0'</td><td>120° 0'</td></tr></table>	Line	Fore Bearing	Back Bearing	AB	60° 30'	240° 30'	BC	122° 0'	302° 0'	CD	46° 0'	226° 0'	DE	205° 30'	25° 30'	EA	300° 0'	120° 0'			
	Line	Fore Bearing	Back Bearing																			
	AB	60° 30'	240° 30'																			
	BC	122° 0'	302° 0'																			
CD	46° 0'	226° 0'																				
DE	205° 30'	25° 30'																				
EA	300° 0'	120° 0'																				
Section - 2																						
3	a) What is a traverse? With neat sketch explain types of traverse?	U	CO-3	05																		
	b) What is local attraction? Write three precautions to be taken while surveying to avoid error due to local attraction	U	CO-3	05																		
	b) What are the different sources of errors in levelling.	U	CO-4	05																		
	d) Calculate the reduce level by Rise and Fall method on a continuous sloping ground with four-meter levelling staff at common interval of 30m. 0.855(onA),1.545,2.335,3.115,3.825,0.455,1.380,2.055,2.855,3.455,0.585,1.015, 1.850, 2.755,3.845 (on B);The reduced level of A was 380.500. Make the entries in a level book and apply usual checks.	An	CO-4	10																		
4	a) Differentiate between surveyor compass and prismatic compass	U	CO-3	05																		
	c) What is closing error in traverse, mention the methods to correct it.	U	CO-3	05																		
	c) Explain the following terms i) Level line ii) Parallax iii) change point iv) Line of sight v) Back sight	U	CO-4	05																		
	d)The following staff reading were observed successively with a level the instrument was shifted after the second and fifth readings. 0.675, 1.230, 0.750, 2.565, 2.225, 1.935, 1.835, 3.220 mt. The first staff reading was taken with the staff held on a Bench Mark of reduced level 125.325 m. Enter the readings in a level Book form and find the reduced levels of all points and apply the check.	An	CO-4	10																		
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, cognitive level and course outcomes.																						

Signature of the Course Coordinator Signature of the HOD Signature of the IQAC Chairman

7. CIE Practice Test model question paper

Program	Civil Engineering			Semester	2nd
Course Name	Basic Surveying			Test	IV
Course Code	25CE22I	Duration	180 min	Marks	50
Name of the Course Coordinator:					
Questions				CO	Marks
1. Conduction of an experiment on Simple levelling/Differential levelling/Fly levelling .				4	20
2. Conduction of an experiment on Profile levelling /Contour block levelling.				4,5	20
Scheme of assessment for Question No 1 and 2. Writing procedure and tabulation- 05M Setting and Conduction – 05M Observation recording – 05M Results and conclusion – 05M Total – 20M					
3. Viva-voce					10
Total Marks					50

Signature of the Course Coordinator

Signature of the HOD

8. Suggestive Activities:

The List is an Example and not inclusive of all possible activities of the course. Student and Faculty are encouraged to choose activities that are relevant to the topic (Atleast one activity for each Course Outcome)

Sl. No.	Suggestive Activities
01	Prepare report on modern survey instruments with their use.
02	Study survey sketch and report your findings.
03	Prepare report on Greenwich Meridian
04	Prepare report on mean sea level
05	Collect and study contour map ,prepare report on your findings

9. Rubrics for Assessment of Activity (Qualitative Assessment)

Sl. No.	Dimension	Beginner	Intermediate	Good	Advanced	Expert	Student Score
		10	20	30	40	50	
1		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	40
2		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	30
3		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	40
4		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	40
5		Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	50

	Average Marks=(40+30+40+40+50)/5=40	40
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Note: Dimension and Descriptor shall be defined by the respective course coordinator as per the activities

11. Equipment/software list with Specification for a batch of 30 students

Sl. No.	Particulars	Specification	Quantity
01	Chain	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.	08
02	Metallic tape	Steel tape, Invar satisfying IS 1269 (Part 1 and Part 2): 1997 specifications	08
03.	Fiber Tape	15m:13 mm. Measuring Tape -15m/50ft With Unbreakable ABS Case. Durable Winding Mechanism Handle and Steel End Hook.	08
04	Pegs	Pegs of length 400 mm and c/s area of 50 mm x 50 mm.	50
05.	Arrows	Arrows 400 mm long and made up of good quality hardened and tempered steel wire of 4 mm in diameter.	50
06.	Metallic Ranging rods	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
07.	Line ranger	Line ranger, optical square confirming to IS: 7999 - 1973 specifications	10
08.	Open cross staff	Open cross staff consisting of 4 metal arms with vertical slits for sighting through.	05
09.	Surveyor compass.	This Survey Compass is made by high quality material and it has perfect finish. Survey Compass made of Gun / Nonmagnetic Metal in a Leather case with Teak wood tripod Stand. Size of compass 100 mm. Dia as per IS specification.	01
10	Prismatic compass	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
11	Dumpy level	Dumpy level confirming to IS: 9613 - 1986 with stand and internal focusing telescope of standard make.	01
12	Automatic levels	Automatic levels confirming to IS: 9613 - 1986 with stand and internal focusing telescope of standard make.	05