Ref No:

SRI KRISHNA INSTITUTE OF TECHNOLOGY , BANGALORE-90

COURSE PLAN

Academic Year 2019-20

Program:	B E – CIVIL ENGINEERING
Semester :	3
Course Code:	18CV35
Course Title:	Basic Surveying
Credit / L-T-P:	4 / 4-0-0
Total Contact Hours:	50
Course Plan Author:	VINOD M

Academic Evaluation and Monitoring Cell

#29, Hesaragatta Main Road, Chimney Hills
Chikkabanavara Post Bangalore-560090
PH-080-23821488/23821315
www.Skit.org, Email: skitprinci1@gmail.com

Table of Contents

Note : Remove “Table of Content” before including in CP Book
Each Course Plan shall be printed and made into a book with cover page
Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	CIVIL ENGINEERING
Semester:	3	Academic Year:	2019-20.
Course Title:	Basic Surveying.	Course Code:	15cv35.
Credit / L-T-P:	4 / 4-0-0.	SEE Duration:	180 Minutes
Total Contact Hours:	50 Hours.	SEE Marks:	60 Marks
CIA Marks:	40 Marks.	Assignment	1 / Module
Course Plan Author:	VINOD M.	Sign .	
Checked By:	MOHAN K T	Sign .	
CO Targets	65%	SEE Target:	60%

Note: Define CIA and SEE % targets based on previous performance.

2. Course Content

Content / Syllabus of the course as prescribed by University or designed by institute. Identify 2 concepts per module as in G.

Module	Content	Teaching Hours	Identified Module Concepts	Blooms Learning Levels
1	Definition of surveying, Objectives and importance of surveying. Classification of surveys. Principles of surveying. Units of measurements, Surveying Measurements and errors, types of errors, precision and accuracy. Classification of maps, map scale, conventional symbols, topographic maps, map layout, Survey of India Map numbering systems. Measuring tape and types. Measurement using tapes, Taping on level ground and sloping ground. Errors and corrections in tape measurements, ranging of lines, direct and indirect methods of ranging, Electronic distance measurement, basic principle. Booking of tape survey work, Field book, entries, Conventional symbols, Obstacles in tape survey, Numerical problems.	10	Introduction and importance of surveying Measurement of Horizontal Distances	L2,L4
2	Basic definitions; meridians, bearings, magnetic and True bearings. Prismatic and surveyor's compasses, temporary adjustments, declination. Quadrantal bearings, whole circle bearings, local attraction and related problems. Theodolite and types, Fundamental axes and parts of Transit theodolite, uses of theodolite, Temporary adjustments of transit theodolite, measurement of horizontal and vertical angles, step by step procedure for obtaining permanent adjustment of Transit theodolite.	10	Compass survey Theodolite survey	L2,L3
3	Traverse Survey and Computations: Latitudes and departures, rectangular coordinates, Traverse adjustments, Bowditch rule and transit rule, Numerical Problems. Basic principle, types of tacheometry, distance equation for horizontal and inclined line of sight in fixed hair method, problems.	10	Traverse survey Tacheometry survey	L2,L3
4	Basic terms and definitions, Methods of leveling, Dumpy level, auto level, digital and laser levels. Curvature and refraction corrections. Booking and reduction of levels. Differential leveling, profile leveling, fly leveling, check leveling, reciprocal leveling, trigonometric leveling (heights and distances-single plane and double plane methods.	10	leveling	L2,L4
5	By dividing the area into geometrical figures, area from offsets, mid ordinate rule, trapezoidal and Simpson's one third	10	Computations of Area	L2

	rule, area from co-ordinates, introduction to planimeter, digital planimeter. Measurement of volumes-trapezoidal and prismoidal formula. Contours, Methods of contouring, Interpolation of contours, contour gradient, characteristics of contours and uses.		and volume contouring	
-	**Total**	**50**	-	-

3. Course Material

Books & other material as recommended by university (A, B) and additional resources used by course teacher (C).
1. Understanding: Concept simulation / video ; one per concept ; to understand the concepts ; 15 – 30 minutes
2. Design: Simulation and design tools used – software tools used ; Free / open source
3. Research: Recent developments on the concepts – publications in journals; conferences etc.

Modules	Details	Chapters in book	Availability
A	**Text books (Title, Authors, Edition, Publisher, Year.)**	-	-
1,2,3,4,5	B.C. Punmia, "Surveying Vol.1", Laxmi Publications pvt. Ltd., New Delhl 2009.	1,2,3,4,5	In Lib / In Dept
1,2,3,4,5	Kanetkar T P and S V Kulkarni , Surveying and Leveling Part I, Pune Vidyarthi Griha Prakashan, 1988	1,2,3,4,5	In Lib/ In dept
B	**Reference books (Title, Authors, Edition, Publisher, Year.)**	-	-
	.S.K. Duggal, "Surveying Vol.1", Tata McGraw Hill Publishing Co. Ltd. New Delhi. – 2009.		In Lib/ In dept
	K.R. Arora, "Surveying Vol. 1" Standard Book House, New Delhi. – 2010		In Lib/ In dept
	R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, New Delhi.		In Lib/ In dept
C	**Concept Videos or Simulation for Understanding**	-	-
C1	http://nptel.ac.in/courses.php?disciplineID=111		
C2	http://wwww.khanacademy.org/		
E	**Recent Developments for Research**	-	-
F	**Others (Web, Video, Simulation, Notes etc.)**	-	-

4. Course Prerequisites

Refer to GL01. If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.
Students must have learnt the following Courses / Topics with described Content . . .

Modules	Course Code	Course Name	Topic / Description	Sem	Remarks	Blooms Level

5. Content for Placement, Profession, HE and GATE

The content is not included in this course, but required to meet industry & profession requirements and help students for Placement, GATE, Higher Education, Entrepreneurship, etc. Identifying Area / Content requires experts consultation in the area.
Topics included are like, a. Advanced Topics, b. Recent Developments, c. Certificate Courses, d. Course Projects, e. New Software Tools, f. GATE Topics, g. NPTEL Videos, h. Swayam videos etc.

Mod	Topic / Description	Area	Remarks	Blooms

ules				Level
1				
3				
3				
5				
-				
-				

B. OBE PARAMETERS

1. Course Outcomes

Expected learning outcomes of the course, which will be mapped to POs. Identify a max of 2 Concepts per Module. Write 1 CO per Concept.

Modules	Course Code.#	Course Outcome **At the end of the course, student should be able to . . .**	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
1	18cv35.1	Student should be able to understand the basics of surveying.	05	Introduction of basic instruments	Lecture	IA	L2 Understand
1	18cv35.2	Student should be able to learn the techniques of survey instruments.	05	techniques	Lecture	IA	L2 Understand
2	18cv35.3	Student should be able to determine the measurement of horizontal distances.	05	Compass survey	Lecture	IA	L3 Apply
2	18cv35.4	Student should be able to understand the practical applications of theodolite	05	Theodolite survey	Lecture	IA	L3 Apply
3	18cv35.5	Student should be able to understand the techniques of compass survey	05	Traverse survey	Lecture	IA	L2 Understand
3	18cv35.6	Student should be able to understand the methods of tacheometry survey	05	Tacheometry survey	Lecture	IA	L2 Understand
4	18cv35.7	Student should be able to Analise the different methods of leveling using dumpy level	05	leveling	Lecture	IA	L4 Analise
4	18cv35.8	Student should be able to Analise the detailed calculations of leveling by using dumpy level.	05	leveling	Lecture	IA	L4 Analise
5	18cv35.9	Student should be able to determine the areas and volume by using arithmetic equations.	05	Computations of areas and volume	Lecture	IA	L3 Apply
5	18cv35.10	Student should be able to understand the spatial data and uses of contours.	05	contouring			L3 Apply
-	**-**	**Total**	**10**	**-**	**-**	**-**	**L2-L4**

2. Course Applications

Write 1 or 2 applications per CO.
Students should be able to employ / apply the course learnings to . . .

Modules	Application Area Compiled from Module Applications.	CO	Level
1	To investigate the ground nature in surveying	CO1	L2
1	Principles and techniques of surveying can be apply before any constructions.	CO2	L2
2	Easy to measure the horizontal distances of any land.	CO3	L3
2	Theodolite survey gives the accuracy and precision of work.	CO4	L3
3	Compass can be used for detailed measurement of bearings and directions on the	CO5	L3

	fields.		
3	Easy to identify the directions of land by using compass.	CO6	L3
4	To get the knowledge of ground profile.	CO7	L2
4	Before any constructions we can apply methods of leveling.	CO8	L2
5	With help of arithmetic equations to calculate the areas and volume of all type of land.	CO9	L3
5	By using contours easy to determine the storage capacity of water bodies.	CO10	L4

3. Mapping And Justification

CO – PO Mapping with mapping Level along with justification for each CO-PO pair.
To attain competency required (as defined in POs) in a specified area and the knowledge & ability required to accomplish it.

Modules	Mapping		Mapping Level	Justification for each CO-PO pair	Level
-	**CO**	**PO**	-	**'Area': 'Competency' and 'Knowledge' for specified 'Accomplishment'**	-
	CO1	PO1	L2	Engineering knowledge of basics of surveying.	L2
	CO1	PO2		Engineering knowledge of basics of surveying.	L2
	CO2	PO1	L2	Engineering knowledge of technics of surveying instruments	L2
	CO2	PO2	L2	Analyses of problems on chain surveying	L3
	CO3	PO1		Understanding the measurement of horizontal distances.	L3
	CO3	PO2	L5	Analyses of problems on horizontal distances	L4
	CO4	PO1	L5	Understanding the practical applications of theodolite	L2
	CO4	PO2		Understanding the practical applications of theodolite	L2
	CO5	PO1	L5	Engineering knowledge of techniques of compass surveying	L3
	CO5	PO2	L5	Analyses of problems on compass surveying	L4
	CO6	PO1		Engineering knowledge of methods of tacheometry surveying	L2
	CO6	PO2	L5	Analyses of problems on tacheometric surveying	L2
	CO7	PO1	L5	Engineering knowledge of different methods of leveling using dumpy level	L2
	CO7	PO2		Analyses of problems on leveling	L4
	CO8	PO1	L5	Engineering knowledge of different methods of leveling using dumpy level	L3
	CO8	PO2	L5	Analyses of problems on leveling	L4
	CO9	PO1		Engineering knowledge of areas and volume by using arithmetic equations.	L3
	CO9	PO2	L5	Analyses of problems on areas and volume by using arithmetic equations.	L4
	CO10	PO1	L5	Understanding the knowledge of spatial data and uses of contours.	L3
	CO10	PO2		Understanding the knowledge of spatial data and uses of contours.	L3

4. Articulation Matrix

CO – PO Mapping with mapping level for each CO-PO pair, with course average attainment.

-	-	Course Outcomes	Program Outcomes															-
Modules	CO.#	**At the end of the course student should be able to . . .**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	Level
1	17cv44.1	Student should be able to understand the basics of surveying.	2	1	-	-	-	-	-	-	-	-	-	-	L2			L2
1	17cv44.2	Student should be able to learn the techniques of survey instruments.	2	1	-	-	-	-	-	-	-	-	-	-	L3			L2
2	17cv44.3	Student should be able to determine the measurement of horizontal distances.	2	2	-	-	-	-	-	-	-	-	-	-	L3			L2
2	17cv44.4	Student should be able to understand the practical applications of theodolite	3	3	-	-	-	-	-	-	-	-	-	-	L2			L2
3	17cv44.5	Student should be able to	3	2	-	-	-	-	-	-	-	-	-	-	L3			L3

		understand the techniques of compass survey																	
3	17cv44.6	Student should be able to understand the methods of tacheometry survey	2	2	-	-	-	-	-	-	-	-	-	-	-	L3			L3
4	17cv44.7	Student should be able to Analise the different methods of leveling using dumpy level	2	1	-	-	-	-	-	-	-	-	-	-	-	L5			L2
5	17cv44.7	Student should be able to Analise the detailed calculations of leveling by using dumpy level.	3	2	-	-	-	-	-	-	-	-	-	-	-				L2
5	17cv44.8	Student should be able to determine the areas and volume by using arithmetic equations.	2	3	-	-	-	-	-	-	-	-	-	-	-				L3
5	17cv44.8	Student should be able to understand the spatial data and uses of contours.	2	2	-	-	-	-	-	-	-	-	-	-	-	L5			L4
-	**CS501PC**	**Average attainment (1, 2, or 3)**	2	1	-	-	-	-	-	-	-	-	-	-	-				**-**
-	*PO, PSO*	*1.Engineering Knowledge; 2.Problem Analysis; 3.Design / Development of Solutions; 4.Conduct Investigations of Complex Problems; 5.Modern Tool Usage; 6.The Engineer and Society; 7.Environment and Sustainability; 8.Ethics; 9.Individual and Teamwork; 10.Communication; 11.Project Management and Finance; 12.Life-long Learning; S1.Software Engineering; S2.Data Base Management; S3.Web Design*																	

5. Curricular Gap and Content

Topics & contents not covered (from A.4), but essential for the course to address POs and PSOs.

Modules	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

6. Content Beyond Syllabus

Topics & contents required (from A.5) not addressed, but help students for Placement, GATE, Higher Education, Entrepreneurship, etc.

Modules	Gap Topic	Area	Actions Planned	Schedule Planned	Resources Person	PO Mapping

C. COURSE ASSESSMENT

1. Course Coverage

Assessment of learning outcomes for Internal and end semester evaluation. Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

Modules	Title	Teaching Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Introduction and measurement of horizontal distances	10	2	-	-	1	-	2	CO1, CO2	L2
2	Measurement of directions and angles compass surveying Theodolite survey and instrument adjustment	10	2	-	-	1		2	CO3, CO4	L3
3	Traversing and Tacheometry	10	-	2	-	1	1	2	CO5, CO6	L3
4	Leveling	10	-	2	-	1	1	2	CO7, C08	L4
5	Areas and volumes contouring	10	-	1	3	1	1	2	CO9, CO10	L3
-	**Total**	**50**	**4**	**5**	**3**	**5**	**3**	**10**	**-**	**-**

2. Continuous Internal Assessment (CIA)

Assessment of learning outcomes for Internal exams. Blooms Level in last column shall match with A.2.

Evaluation	Weightage in Marks	CO	Levels	Evaluation
CIA Exam – 1	40	CO1, CO2, CO3, CO4	CIA Exam – 1	CIA Exam – 1
CIA Exam – 2	40	CO5, CO6, CO7, C08	CIA Exam – 2	CIA Exam – 2
CIA Exam – 3	40	CO9, CO10	CIA Exam – 3	CIA Exam – 3
Assignment - 1	05	CO1, CO2, CO3, CO4	Assignment - 1	Assignment - 1
Assignment - 2	05	CO5, CO6, CO7, C08	Assignment - 2	Assignment - 2
Assignment - 3	05	CO9, CO10	Assignment - 3	Assignment - 3
Seminar - 1	05	CO1, CO2, CO3, CO4	Seminar - 1	Seminar - 1
Seminar - 2	05	CO5, CO6,CO7,CO8	Seminar - 2	Seminar - 2
Seminar - 3	05	CO9, CO10	Seminar - 3	Seminar - 3
Other Activities – define – Slip test		CO1 to Co9	Other Activities – define – Slip test	
Final CIA Marks	**40**	**-**	**-**	

D1. TEACHING PLAN - 1

Module - 1

Title:	Introduction measurement of horizontal distances	Appr Time:	08 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Understand the basics of surveying.	CO1	L2
2	learn the techniques of survey instruments	CO2	L2
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	Introduction and Definition of surveying	C01	L1
2	Objectives and importance of surveying	C01	L1

3	Classification of surveys. Principles of surveying. Units of measurements	C01	L2
4	Surveying Measurements and errors, types of errors, precision and accuracy. Classification of maps, map scale	C01	L2
5	conventional symbols, topographic maps, map layout, Survey of India Map numbering systems	C01	L2
6	Measuring tape and types. Measurement using tapes	C01	L2
7	Taping on level ground and sloping ground. Errors and corrections in tape measurements	C02	L2
8	ranging of lines, direct and indirect methods of ranging, Electronic distance measurement	C02	L2
9	basic principle. Booking of tape survey work, Field book, entries	C02	L2
10	Conventional symbols, Obstacles in tape survey, Numerical problems	C02	L2
c	**Application Areas**	**CO**	**Level**
1	To investigate the ground nature in surveying	CO1	L2
2	Principles and techniques of surveying can be apply before any constructions.	CO2	L2
d	**Review Questions**	-	-
1	Define surveying ? Write the principles of surveying.	CO1	L1
2	Write and explain classifications of survey.	CO1	L2
3	Define errors, precision, accuracy	CO2	L2
4	Define ranging ? Write and explain methods of ranging.	CO2	L2
5	Write obstacles in chaining , ranging but not chaining.	CO2	L2
6	A 20 M chain was found to be 10 cm too long after chaining a distance of 1500m. It was found to be 18cm too long at the end of days work after chaining total distance of 2900m. Find the true distance if the chain was correct before the commencement of the work.	CO2	L2
e	**Experiences**	-	-
1			
2			
3			

Module – 2

Title:	Measurement of directions and angles: compass survey theodolite survey and instrument adjustment	Appr Time:	08 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Student should be able to determine the measurement of horizontal distances.	CO3	L4
2	Student should be able to understand the practical applications of theodolite	CO4	L3
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	Basic definitions; meridians, bearings, magnetic and True bearings	C03	L2
2	Prismatic and surveyor's compasses	C03	L2
3	temporary adjustments, declination, Quadrantal bearings, whole circle bearings	C03	L2
4	local attraction and related problems. Theodolite and types	C04	L2
5	Fundamental axes and parts of Transit theodolite	C04	L3
6	uses of theodolite, Temporary adjustments of transit theodolite	C04	L3
7	measurement of horizontal and vertical angles	C04	L3
8	step by step procedure for obtaining permanent adjustment of Transit theodolite	C04	L3
9	step by step procedure for obtaining permanent adjustment of Transit theodolite	C04	L3

10	Basic definitions; meridians, bearings, magnetic and True bearings, Prismatic and surveyor's compasses	CO4	L3
11	temporary adjustments, declination	CO4	L3
c	**Application Areas**	**CO**	**Level**
1	Easy to measure the horizontal distances of any land.	CO3	L2
2	Theodolite survey gives the accuracy and precision of work.	CO4	L3
d	**Review Questions**	-	-
1	Give in a tabular form, the difference between prismatic compass and surveyors compass.	CO3	L2
2	What is local attraction? How is it detected and eliminated ?	CO3	L2
3	The following are bearings taken on a closed traverse. Line F.B. B.B AB 80°10' 259°0' BC 120° 20' 301°50' CD 170°50' 350°50' DE 230° 10' 49°30' EA 310°20' 139°15' compute the interior angles and correct them for observational errors. Assuming the observed bearings of the line C D to be adjust the bearing of the remaining sides.	CO3	L2
4	With neat sketch fundamental lines and desired relations of transit theodolite.	CO4	L2
5	Explain the temporary adjustments of transit theodolite.	CO4	L2
e	**Experiences**	-	-

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	18CV35	Sem:	III	Marks:	40	Time:	75 minutes
Course:	Basic Surveying						

-	-	**Note: Answer any 1 questions from each module, each carry equal marks.**	**CO**	**Level**	**Marks**
		Module-1			
1	a	Define surveying ? Write the principles of surveying.	15	CO1	L1
	b	Write obstacles in chaining , ranging but not chaining.			L2
	c	A 20 M chain was found to be 10 cm too long after chaining a distance of 1500m. It was found to be 18cm too long at the end of days work after chaining total distance of 2900m. Find the true distance if the chain was correct before the commencement of the work.		CO2	L3
2	a	Define ranging ? Write and explain methods of ranging.	15	CO2	L2
	b	Give in a tabular form, the difference between prismatic compass and surveyors compass.		CO3	L3
	c	What is local attraction? How is it detected and eliminated ?		CO3	L3
3	a	The following are bearings taken on a closed traverse. Line F.B. B.B AB 80°10' 259°0' BC 120° 20' 301°50' CD 170°50' 350°50' DE 230° 10' 49°30' EA 310°20' 139°15' compute the interior angles and correct them for observational errors. Assuming the observed bearings of the line C D to be adjust the bearing of the remaining sides.	15	CO3	L3
	b	With neat sketch fundamental lines and desired relations of transit theodolite.		CO4	L2

	c	Explain the temporary adjustments of transit theodolite.		CO4	L2

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	18CV35	Sem:	III	Marks:	10	Time:	90 – 120 minutes
Course:	Basic Surveying						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT17CV101	Define surveying ? Write the principles of surveying.	5	CO1	L2
2	1KT17CV102	Write and explain classifications of survey.	5	CO1	L2
3	1KT17CV103	Define errors, precision, accuracy	5	CO2	L2
4	1KT17CV104	Define ranging ? Write and explain methods of ranging.	5	CO2	L3
5	1KT17CV105	Write obstacles in chaining , ranging but not chaining.	5	CO3	L2
6	1KT17CV106	Give in a tabular form, the difference between prismatic compass and surveyors compass.	5	CO3	L2
7	1KT17CV107	What is local attraction? How is it detected and eliminated ?	5	CO3	L2
8	1KT17CV108	With neat sketch fundamental lines and desired relations of transit theodolite.	5	CO3	L3
9	1KT17CV109	Explain the temporary adjustments of transit theodolite.	5	CO4	L2
10	1KT17CV110	Enumerate the application of theodolite.	5	CO4	L2

D2. TEACHING PLAN - 2

Module – 3

Title:	Traversing and Tacheometry	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Student should be able to understand the techniques of compass survey	CO5	L2
2	Student should be able to understand the methods of tacheometry survey	CO6	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Traverse Survey and Computations	CO5	L2
2	Latitudes and departures, rectangular coordinates	CO5	L2
3	Traverse adjustments, Traverse adjustments	CO5	L2
4	Numerical Problems	CO5	L3
5	Numerical Problems	CO5	L3
6	basic principle, types of tacheometry	CO6	L2
7	distance equation for horizontal and inclined line of sight in fixed hair method	CO6	L2
8	distance equation for horizontal and inclined line of sight in fixed hair method	CO6	L2
9	Numerical Problems	CO6	L3
10	Numerical Problems	CO6	L3
c	**Application Areas**	**CO**	**Level**
1	Compass can be used for detailed measurement of bearings and directions on the fields.	CO5	L3
2	Easy to identify the directions of land by using compass.	CO6	L3
d	**Review Questions**	-	-
1	Distinguish between chain survey and traverse surveying.	CO5	L2
2	Briefly explain closed traverse and open traverse.	CO5	L2
3	Explain clearly,with the help of illustrations, how traverse is balanced.	CO5	L3
4	What are the different methods employed in tacheometric survey ? Describe the method most commonly used.	CO6	L3

<table>
<tr><td>5</td><td>An observer standing on the deck of a ship just sees the top of light house which is 40m
above the sea level. If the height of the observer's eye is 8m above theCO6 sea level, determine
the distance of the observer from the light house</td><td>CO6</td><td>L3</td></tr>
<tr><td>6</td><td>Two points A and B, 1530m apart are separated by a wide river. The following reciprocal levels were taken with one level :
<table><tr><td rowspan="2">Instrument at</td><td colspan="2">Staff readings at</td></tr><tr><td>A</td><td>B</td></tr><tr><td>A</td><td>3.810m</td><td>2.165m</td></tr><tr><td>B</td><td>2.355m</td><td>0.910m</td></tr></table>The collimation error was —0.0004m per 100m. Calculate the true level difference between A and B and the refraction.</td><td>CO5</td><td>L3</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>e</td><td>Experiences</td><td>-</td><td>-</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
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Module – 4

Title:	Concrete mix Proportioning.	Appr Time:	08 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Student should be able to Analise the different methods of leveling using dumpy level	CO7	L4
2	Student should be able to Analise the detailed calculations of leveling by using dumpy level.	CO8	L4
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Basic terms and definitions	CO7	L3
2	Methods of leveling, Dumpy level, auto level	CO7	L3
3	digital and laser levels. Curvature and refraction corrections	CO7	L3
4	Booking and reduction of levels, Differential leveling	CO7	L
5	profile leveling, fly leveling, check leveling	CO8	L4
6	check leveling, reciprocal leveling	CO8	L4
7	trigonometric leveling (heights and distances-single plane and double plane methods	CO8	L4
8	trigonometric leveling (heights and distances-single plane and double plane methods	CO8	L4
9	trigonometric leveling (heights and distances- double plane methods)	CO8	L4
10	trigonometric leveling (heights and distances- double plane methods)	CO8	L4
c	**Application Areas**	**CO**	**Level**
1	To get the knowledge of ground profile.	CO7	L3
2	Before any constructions we can apply methods of leveling.	CO8	L4
d	**Review Questions**	-	-
1	Define leveling ? Write types of leveling.	CO7	L2
2	Illustrate with neat sketches : i) Profile leveling ii) Differential leveling iii) Reciprocal leveling and	CO7	L3

	iv) Block leveling		
3	List and explain the temporary adjustments of a dumpy level	CO8	L3
4	Two points A and B are 1530 m apart across a wide river. The following reciprocal levels are taken with one level. Level @ Reading A on B (M) A 2.165 3.180 B 0.910 2.355 The error in the Collimation adjustments of the level is —0.004m in 100 m. Calculate the true difference of levels between A and B and the refraction.	CO8	L4
5	Enumerate the errors in Leveling.	CO8	L4
6	The following staff readings were observed successively with level, the instrument having been moved after the third,sixth and eighth readings: 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684, meters. Enter the above readings in a page of a level book and calculate the R L of the points, if the first reading was taken with a staff held on a bench mark of 432.384 m.	CO8	L4
7	Define sensitiveness of bubble tube. Describe the field procedure to determine the sensitiveness of bubble tube.	CO8	L3
8	Find the elevation of the top of the chimney from the following data: Inst Station / Reading on BM (m) / Angle of elevation / remarks A / 0.865 / 18°36' / RL of BM = 421.380m B / 1.225 / 10°12' / Distance AB = 50m Stations A, B and top of chimney are in the same vertical plane. Station chimney.	CO8	L4
e	**Experiences**	-	-
1			
2			
3			
4			
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	18cv35	Sem:	III	Marks:	40	Time:	75 minutes
Course:	Basic Surveying						

-	-	**Note: Answer any 2 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	Distinguish between chain survey and traverse surveying.	15	CO5	L1
	b	Briefly explain closed traverse and open traverse.			L2
	c	Two points A and B, 1530m apart are separated by a wide river. The following reciprocal levels were taken with one level : Instrument at / Staff readings at: A / B A / 3.810m / 2.165m B / 2.355m / 0.910m The collimation error was —0.0004m per 100m. Calculate the true level difference between A and B and the refraction.		CO6	L3
2	a	What are the different methods employed in tacheometric survey ? Describe the method most commonly used.	15	CO7	L2
	b	An observer standing on the deck of a ship just sees the top of light house which is 40m above the sea level. If the height of the observer's			L4

<table>
<tr><td></td><td></td><td>eye is 8m above the sea level, determine the distance of the observer from the light house</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>a</td><td>illustrate with neat sketches :
i) Profile leveling
ii) Differential leveling
iii) Reciprocal leveling and
iv) Block leveling</td><td>15</td><td>CO8</td><td>L2</td></tr>
<tr><td></td><td>b</td><td>Find the elevation of the top of the chimney from the following data:
<table><tr><td>Inst Station</td><td>Reading on BM (m)</td><td>Angle of elevation</td><td>remarks</td></tr><tr><td>A</td><td>0.865</td><td>18°36'</td><td>RL of BM = 421.380m</td></tr><tr><td>B</td><td>1.225</td><td>10°12'</td><td>Distance AB = 50m</td></tr></table>Stations A, B and top of chimney are in the same vertical plane. Station chimney.</td><td></td><td>CO8</td><td>L4</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	18CV35	Sem:	III	Marks:	10	Time:	90 – 120 minutes
Course:	Basic Surveying						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT17CV101	Distinguish between chain survey and traverse surveying.	5	CO6	L2
2	1KT17CV102	Briefly explain closed traverse and open traverse.	5	CO6	L3
3	1KT17CV103	Explain clearly,with the help of illustrations, how traverse is balanced.		CO7	L4
4	1KT17CV104	What are the different methods employed in tacheometric survey ? Describe the method most commonly used.	5	CO7	L3
5	1KT17CV105	Distinguish between chain survey and traverse surveying.	5	CO7	L3
6	1KT17CV106	Enumerate the errors in Leveling.	5	CO8	L3
7	1KT17CV107	illustrate with neat sketches : i) Profile leveling ii) Differential leveling iii) Reciprocal leveling and iv) Block leveling		CO8	L3
8	1KT17CV108	Define sensitiveness of bubble tube. Describe the field procedure to determine the sensitiveness of bubble tube.	5	CO8	L3
9	1KT17CV109	The following staff readings were observed successively with level, the instrument having been moved after the third,sixth and eighth readings: 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684, meters. Enter the above readings in a page of a level book and calculate the R L of the points, if the first reading was taken with a staff held on a bench mark of 432.384 m.	5	CO8	L4

D3. TEACHING PLAN - 3

Module – 5

Title:	Areas and volumes Contouring	Appr Time:	08 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Student should be able to determine the areas and volume by using arithmetic equations.	CO9	L2
2	Student should be able to understand the spatial data and uses of contours.	CO10	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Measurement of area – by dividing the area into geometrical figures	CO9	L2
2	area from offsets, mid ordinate rule	CO9	L3
3	trapezoidal and Simpson's one third rule, area from co-ordinates	CO9	L2
4	introduction to planimeter, digital planimeter	CO9	L3
5	Measurement of volumes-trapezoidal and prismoidal formula	CO10	L2
6	Contours, Methods of contouring	CO10	L3
7	Interpolation of contours, contour gradient	CO10	L2
8	characteristics of contours and uses	CO10	L3
9	Numerical Problems	CO10	L2
10	Numerical Problems	CO10	L3
c	**Application Areas**	**CO**	**Level**
1	With help of arithmetic equations to calculate the areas and volume of all type of land.	CO10	L3
2	By using contours easy to determine the storage capacity of water bodies.	CO9	L4
d	**Review Questions**	-	-
1	Define contour. List the uses of contour maps.	CO10	L2
2	Explain the characteristics of contours.	CO10	L3
3	Explain with neat sketch, the procedure for: i) Radiation method ii) Intersection method in plane table surveying	CO9	L3
4	What do you mean by orientation of plane table? Explain the different methods of orientation?	CO9	L4
5	Define Resection and hence state three point problem.	CO9	L2
6	Define the following : (i) Contour (ii) Contour interval (ii) Horizontal equivalent.	CO10	L3
7	List the characteristics of contour with the help of neat sketches.	CO10	L3
8	The following offsets were taken from a chain line to an irregular boundary line at an interval of 10m. Compute the area by trapezoidal and Simpson's rule. Offsets : 0 , 2.5 , 3.5 , 5.0 , 4.6 , 3.2 and 0 m.	CO10	L4
9	List the differences between polymer – impregnated concrete, polymer – modified concrete, and polymer concrete.	CO8	L2
10	What are the various quality control tests done to ensure good performance of polymer concrete?	CO8	L2
e	**Experiences**	-	-
1		CO9	L2
2			
3			
4		CO10	L2
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	18CV35	Sem:	III	Marks:	15	Time:	75 minutes		
Course:	Basic Surveying								
-	**-**	**Note: Answer any 2 questions, each carry equal marks.**					**Marks**	**CO**	**Level**
1	a	Define contour. List the uses of contour maps.					15	CO9	L2
	b	Explain the characteristics of contours.						CO9	L2
	c	lain with neat sketch, the procedure for: i) Radiation method ii) Intersection method in plane table surveying						CO9	L3
2	a	List the characteristics of contour with the help of neat sketches.					15	CO10	L2
	b	The following offsets were taken from a chain line to an irregular boundary line at an interval of 10m. Compute the area by trapezoidal and Simpson's rule. Offsets : 0 , 2.5 , 3.5 , 5.0 , 4.6 , 3.2 and 0 m.						CO10	L4
3	a	What do you mean by orientation of plane table? Explain the different methods of orientation?					15	CO9	L2
	b	Define Resection and hence state three point problem.						CO10	L2
	c	Define the following : (i) Contour (ii) Contour interval (ii) Horizontal equivalent.						CO10	L2

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions									
Crs Code:	18CV35	Sem:	III	Marks:	10	Time:	90 – 120 minutes		
Course:	Basic surveying								
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.									
SNo	**USN**	**Assignment Description**					**Marks**	**CO**	**Level**
1	1KT17CV101	Define contour. List the uses of contour maps.					5	CO9	L2
2	1KT17CV102	Explain the characteristics of contours.					5	CO9	L3
3	1KT17CV103	lain with neat sketch, the procedure for: i) Radiation method ii) Intersection method in plane table surveying						CO10	L4
4	1KT17CV104	What do you mean by orientation of plane table? Explain the different methods of orientation?					5	CO10	L3
5	1KT17CV105	Define Resection and hence state three point problem.					5	CO10	L3
6	1KT17CV106	Define the following : (i) Contour (ii) Contour interval (ii) Horizontal equivalent.					5	CO10	L3
7	1KT17CV107	List the characteristics of contour with the help of neat sketches.					5	CO10	L3
8	1KT17CV108	Define contour. List the uses of contour maps.					5	CO10	L3
9	1KT17CV109	Explain the procedure adopted to measure the distance between two mutually inaccessible points by plane table surveying.					5	CO10	L3
10	1KT17CV110	Describe the method of 'Resection' by 'Bessels graphical method".					5	CO10	L3

F. EXAM PREPARATION

1. University Model Question Paper

Course:	Basic Surveying					Month / Year	Dec/19	
Crs Code:	18CV35	Sem:	III	Marks:	100	Time:	180 minutes	
-	**Note**	Answer all FIVE full questions. All questions carry equal marks.				**Marks**	**CO**	**Level**
1	a	How do you classify survey? Explain in detail.				8/20	CO1	l2
	b	Differentiate between : (i) Precision and Accuracy (ii) Plan and map				8		l2

	c	The distance between two points measured along a slope is 265 m. Find the horizontal distance between them if, (i) the angle of slope is 4˚ 42' (ii) the difference in level is 27m	4	CO2	l3
		OR			
2	a	Explain different types of chains and tapes.	10/ 20	CO1	l2
	b	30 m chain was found to be 15 cm too long after chaining 1524 m. The same chain was found to 30.5 cm too long after chaining a total distance of 3048 m. Find the true distance chained assuming the chain was correct at the commencement of chaining.	10	CO2	l3
3	a	What is meant by plane table surveying? List the chain surveying equipments.	5/ 20	C03	l2
	b	What are offsets? Explain the types of offsets.	5		l2
	c	In chaining past a pond, stations A and D on the main line were taken on the opposite sides of the pond. Two lines DB and DC measuring 250 m and 300 m were laid down to the left and right of the line AD. The points A, B and C are on the same line. AB and AC are measured and are found to be equal to 120 m and 130 m. Find the length of line AD.	10	CO4	l3
		OR			
4	a	Differentiate between the following : i) Open traverse and closed traverse (ii) W.C.B and Q.B (iii) Magnetic Dip and Declination (iv) Isogonic line and agonic line (v) Magnetic bearing and true bearing	15/ 20	CO3	l3
	b	During a closed traverse survey ABCDA, the following interior angles were measured with a compass LA = 75˚ , LB = 120˚, LC = 80˚ and ZD = 85˚. If the bearing of the line AB is 99˚, what are the bearings of the remaining lines of the traverse?	5	CO4	l4
5	a	List the errors in compass surveying and explain.	8 / 20	CO5	l3
	b	With the help of neat sketches explain Bowditch graphical method of adjustment of closing error in a closed traverse.	8		l4
	c	The magnetic bearing of a line is 105˚ 30'. At that time of observation if magnetic declination is 6˚ 15' E, find the true bearing of the line. Also draw the relevant sketch.	4	CO6	l4
6	a	Explain the following : (i) Balancing of sights (ii) Profile leveling	6 / 20	CO7	l2
	b	During fly leveling, the following readings were taken: B.S : 0.620, 2.050, 1.420, 2.630, and 2.420 F.S : 2.440, 1.350, 0.530, 2.410 The first B.S was taken on a B.M of R.L 100.000 metres. From the last B.S it is required to set 4 pegs each at distance of 30 metres on a rising gradient 1 in 200. Enter these readings in a level book form and calculate the R.L of the top of each peg by "Rise and Fall" method. Also calculate the staff reading on each peg and apply the usual checks.	14		l4
		OR			
7	a	Define the following : (i) Contour (ii) Contour interval (iii) Horizontal equivalent	6/ 20	CO9	l2
	b	List the various important factors to be considered at the time of selecting the contour interval and explain.	6	CO9	l2
	c	List the characteristics of contour with the help of neat sketches.	8	CO10	l2
8	a	What do you mean by plane tabling? List the plane table and its accessories.	5/ 20	CO10	l4

	b	List the various important factors to be considered at the time of selecting the contour interval and explain.	6	CO10	l4
	c	List the characteristics of contour with the help of neat sketches.	9	CO10	l4

2. SEE Important Questions

Course:	Basic Surveying					Month / Year	Dec/19	
Crs Code:	18CV35	Sem:	III	Marks:	100	Time:	180 minutes	
	Note	Answer all FIVE full questions. All questions carry equal marks.				-	-	
Module	Qno.	Important Questions				**Marks**	**CO**	**Year**
1	1	Distinguish between plane surveying and Geodetic surveying.				5/ 20	CO1	2016
	2	Explain the terms : i) Accuracy ii) Precision iii) Discrepancy				6	CO2	2016
	3	A 30 meter chain was tested before the commencement of day's work and was found to be correct. After chaining 100 chains, the chain was found to be half decimeter too long. At the end of the day's work, after chaining another 100 chains, the chain was found to be one decimeter too long. What was the total true distance chained?				4	CO2	2016
	4	Define surveying ? Write the principles of surveying.				2	CO2	2015
	5	Write and explain classifications of survey.				3	CO2	2015
2	1	State the important points considered while selecting main stations in surveying.				16 / 20	CO3	2015
	2	With neat sketch, explain reciprocal ranging.					CO3	2015
	3	What is local attraction? How is it detected and eliminated ?					CO3	2014
	4	With neat sketch fundamental lines and desired relations of transit theodolite.					CO4	2016
	5	Explain the temporary adjustments of transit theodolite.					CO4	2014
3	1	With a neat sketch, explain the working of prism square.				16 / 20	CO5	2015
	2	Define: i) Survey lines ii) Check lines iii) Tie lines					CO5	2016
	3	Briefly explain closed traverse and open traverse.					CO5	2017
	4	Explain clearly,with the help of illustrations, how traverse is balanced.					CO6	2017
	5	What are the different methods employed in tacheometric survey ? Describe the method most commonly used.					CO6	2016
4	1	illustrate with neat sketches : i) Profile leveling ii) Differential leveling iii) Reciprocal leveling and iv) Block leveling				16 / 20	CO7	2017
	2	List and explain the temporary adjustments of a dumpy level					CO7	2014
	3	Find the elevation of the top of the chimney from the following data Inst Station / Reading on BM (m) / Angle of elevation / remarks A / 0.865 / 18°36' / RL of BM = 421.380m B / 1.225 / 10°12' / Distance AB = 50m Stations A, B and top of chimney are in the same vertical plane. Station chimney.					CO8	2015
	4	What is local attraction? How is it determined and eliminated?					CO8	2014
	5	Define : i) Dependent co-ordinates ii) Independent co-ordinates					CO8	2015

5	1	Define contour. List the uses of contour maps.	16 / 20	CO9	2014
	2	Explain the characteristics of contours.		CO9	2016
	3	Explain with neat sketch, the procedure for: i) Radiation method ii) Intersection method in plane table surveying		CO	2015
	4	The following offsets were taken from a chain line to an irregular boundary line at an interval of 10m. Compute the area by trapezoidal and Simpson's rule. Offsets : 0 , 2.5 , 3.5 , 5.0 , 4.6 , 3.2 and 0 m.		CO10	2014
	5	Define contour. List the uses of contour maps.		CO10	2014

G. Content to Course Outcomes

1. TLPA Parameters

Table 1: TLPA – Example Course

Module-#	Course Content or Syllabus (Split module content into 2 parts which have similar concepts)	Content Teaching Hours	Blooms' Learning Levels for Content	Final Blooms' Level	Identified Action Verbs for Learning	Instruction Methods for Learning	Assessment Methods to Measure Learning
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*
1	Definition of surveying, Objectives and importance of surveying. Classification of surveys. Principles of surveying. Units of measurements, Surveying Measurements and errors, types of errors, precision and accuracy. Classification of maps, map scale, conventional symbols, topographic maps, map layout, Survey of India Map numbering systems.	5	- L1 - L2	L2	- -	- Lecture - -	- Slip Test - -
1	Measuring tape and types. Measurement using tapes, Taping on level ground and sloping ground. Errors and corrections in tape measurements, ranging of lines, direct and indirect methods of ranging, Electronic distance measurement, basic principle. Booking of tape survey work, Field book, entries, Conventional symbols, Obstacles in tape survey, Numerical problems.	5	- L3 - L4	L4	- -	- Lecture - Tutorial -	- Assignment - -
2	Basic definitions; meridians, bearings, magnetic and True bearings. Prismatic and surveyor's compasses, temporary adjustments, declination. Quadrantal bearings, whole circle bearings, local attraction and related problems.	5	- L2 - L3	L3	- -	- Lecture -	- Assignment -
2	Theodolite and types, Fundamental axes and parts of Transit theodolite, uses of theodolite, Temporary adjustments of transit theodolite, measurement of horizontal and vertical angles, step by step procedure for obtaining permanent adjustment of Transit theodolite.	5	- L2 - L2	L2	- -	- Lecture -	- Slip Test -
3	Traverse Survey and Computations: Latitudes and departures, rectangular coordinates, Traverse adjustments, Bowditch rule and transit rule, Numerical Problems.	5	- L1 - L3	L3	- -	- Lecture -	- Slip Test -
3	Basic principle, types of tacheometry, distance equation for horizontal and inclined line of sight in fixed hair method, problems.	5	- L3 - L2	L3	- -	- Lecture - Tutorial -	- Assignment - -
4	Basic terms and definitions, Methods of leveling, Dumpy level, auto level, digital and	5	- L3 - L1	L3	- -	- Lecture	- Assignment

	laser levels. Curvature and refraction corrections. Booking and reduction of levels.					- Tutorial -	- -
4	Differential leveling, profile leveling, fly leveling, check leveling, reciprocal leveling, trigonometric leveling (heights and distances-single plane and double plane methods.	5	- L2 - L4	L4	- -	- Lecture - Tutorial -	- Assignment - -
5	By dividing the area into geometrical figures, area from offsets, mid ordinate rule, trapezoidal and Simpson's one third rule, area from co-ordinates, introduction to planimeter, digital planimeter. Measurement of volumes-trapezoidal and prismoidal formula.	5	- L2 - L2	L2	- -	- Lecture - -	- Assignment - -
5	Contours, Methods of contouring, Interpolation of contours, contour gradient, characteristics of contours and uses.	5	- L2 - L2	L2	- -	- Lecture - -	- Assignment - -

2. Concepts and Outcomes:

Table 2: Concept to Outcome – Example Course

Module-#	Learning or Outcome from study of the Content or Syllabus	Identified Concepts from Content	Final Concept	Concept Justification (What all Learning Happened from the study of Content / Syllabus. A short word for learning or outcome)	CO Components (1.Action Verb, 2.Knowledge, 3.Condition / Methodology, 4.Benchmark)	Course Outcome **Student Should be able to ...**
A	*I*	*J*	*K*	*L*	*M*	*N*
1	- -	- -	Introduction of basic instruments	Engineering knowledge of basics of surveying.	- Understand - basics of surveying. - -	understand the basics of surveying.
1	- -	- -	techniques	Engineering knowledge of basics of surveying.	- basics of surveying -	learn the techniques of survey instruments.
2	- -	- -	Compass survey	Engineering knowledge of technics of surveying instruments	- technics of surveying - -	determine the measurement of horizontal distances.
2	- -	- -	Theodolite survey	Analyses of problems on chain surveying	- Understand - chain surveying -	understand the practical applications of theodolite
3	- -	- -	Traverse survey	Understanding the measurement of horizontal distances.	- Understand - measurement of horizontal distances. - -	understand the techniques of compass survey
3	- -	- -	Tacheometry survey	Analyses of problems on horizontal distances	- Apply horizontal distances - -	understand the methods of tacheometry survey
4	- -	- -	leveling	Understanding the practical applications of theodolite	- Apply - theodolite	Analise the different methods of leveling using dumpy level

5	- -	- -	leveling	Understanding the practical applications of theodolite	- Understand - theodolite	Analise the detailed calculations of leveling by using dumpy level.
5			Computations of areas and volume	Engineering knowledge of techniques of compass surveying	- Understand - techniques of compass surveying	determine the areas and volume by using arithmetic equations.