CE6304-SURVEYING I

SUBJECT DESCRIPTION AND OBJECTIVE

SUBJECT DESCRIPTION

This introductory course in land surveying will explore the theory, history and practice of plane surveying. It includes the use and care of transits, levels, and tapes, as well as their more modern counterparts. The emphasis of the course is placed on laboratory problems including but not limited to: area measurements, elevation determinations, angle collection methods, traverse calculations, and topographic map compilation. Office and field methods are covered.

OBJECTIVE:

At the end of the course the student will posses knowledge about Chain surveying, Compass surveying, Plane table surveying, Levelling, Theodolite surveying and Engineering surveys. Students are expected to use all surveying equipments, prepare LS & CS, contour maps and carryout surveying works related to land and civil engineering projects.

On successful completion of this subject students should be able to:
(i) demonstrate a knowledge of the principles and techniques of basic surveying;
(ii) be able to identify appropriate equipment required for tasks in basic surveying;
(iii) show how to reduce data obtained from fieldwork to a useable form;
(iv) demonstrate an understanding of accuracy of measurement required in surveying.

CE6304 **SURVEYING I** **L T P C**
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OBJECTIVES:

To introduce the principles of various surveying methods and applications to Civil Engineering projects

UNIT I FUNDAMENTALS AND CHAIN SURVEYING 9

Definition- Classifications - Basic principles-Equipment and accessories for ranging and chaining – Methods of ranging - well conditioned triangles – Errors in linear measurement and their corrections - Obstacles - Traversing – Plotting – applications- enlarging the reducing the figures – Areas enclosed by straight line irregular figures- digital planimetre.

UNIT II COMPASS AND PLANE TABLE SURVEYING 9

Compass – Basic principles - Types - Bearing - Systems and conversions- Sources of errors - Local attraction - Magnetic declination-Dip-Traversing - Plotting - Adjustment of closing error – applications - Plane table and its accessories - Merits and demerits - Radiation - Intersection - Resection – Traversing- sources of errors – applications.

UNIT III LEVELLING 9

Level line - Horizontal line - Datum - Bench marks -Levels and staves - temporary and permanent adjustments – Methods of levelling - Fly levelling - Check levelling - Procedure in levelling - Booking -Reduction - Curvature and refraction - Reciprocal levelling – Sources of Errors in levelling- Precise levelling - Types of instruments - Adjustments - Field procedure

UNIT IV LEVELLING APPLICATIONS 9

Longitudinal and Cross-section-Plotting - Contouring - Methods - Characteristics and uses of contours – Plotting – Methods of interpolating contours – Computations of cross sectional areas and volumes - Earthwork calculations - Capacity of reservoirs - Mass haul diagrams.

UNIT V THEODOLITE SURVEYING 9

Theodolite - Types - Description - Horizontal and vertical angles - Temporary and permanent adjustments – Heights and distances– Tangential and Stadia Tacheometry – Subtense method - Stadia constants - Anallactic lens.

TOTAL: 45 PERIODS

OUTCOMES:

Students are expected to use all surveying equipments, prepare LS & CS, contour maps and carryout surveying works related to land and civil engineering projects.

TEXT BOOKS:

1. Chandra A.M., "Plane Surveying", New Age International Publishers, 2002.
2. Alak De, "Plane Surveying", S. Chand & Company Ltd., 2000.

REFERENCES:

1. James M. Anderson and Edward M. Mikhail, "Surveying, Theory and Practice",7th Edition, McGraw Hill, 2001.
2. Bannister and S. Raymond, "Surveying", 7th Edition, Longman 2004.
3. Roy S.K., "Fundamentals of Surveying", 2nd Edition, Prentice Hall of India, 2004.
4. Arora K.R.,"Surveying Vol I & II", Standard Book house, 10th Edition 2008.

MICRO LESSON PLAN

WEEK	LECT. NO	TOPICS TO BE COVERED	TEXT/REFER BOOKS
UNIT I FUNDAMENTALS AND CHAIN SURVEYING			
I	1	Definition,Classifications	Refer Book 4
	2	Basic principles,Equipment and accessories for ranging and chaining	
	3	Methods of ranging ,well conditioned triangles	
	4	Errors in linear measurement and their corrections	
II	5,6	Obstacles	
	7	Traversing ,Plotting ,applications	
	8	Enlarging the reducing the figures	
	9,10	Areas enclosed by straight line irregular figures,digital planimetre.	
UNIT II COMPASS AND PLANE TABLE SURVEYING			
III	11	Compass, Basic principles	Refer Book 4
	12	Types,Bearing ,Systems and conversions	
	13	Sources of errors, Local attraction	
	14	Magnetic declination, Dip	
IV	15	Traversing,Plotting, Adjustment of closing error, applications	
	16	Plane table and its accessories, Merits and demerits	
	17	Radiation, Intersection	
	18	Resection, Traversing	
	19	Sources of errors, applications.	
UNIT III LEVELLING			
V	20	Level line, Horizontal line, Datum , Bench marks, Levels and staves	Refer Book 4
	21	Temporary and permanent adjustments	
	22	Methods of leveling, Fly levelling, Check levelling, Procedure in levelling	
	23	Booking , Reduction	
	24	Problems	
VI	25	Curvature and refraction	
	26	Reciprocal leveling, Sources of Errors in leveling, Precise levelling	
	27	Problems	
	28	Types of instruments, Adjustments, Field procedure	
UNIT IV LEVELLING APPLICATIONS			
VII	29	Longitudinal and Cross-section,Plotting	Refer Book 4
	30	Contouring , Methods	
	31	Characteristics and uses of contours	
	32	Plotting, Methods of interpolating contours	
VIII	33	Computations of cross sectional areas and volumes	
	34	Earthwork calculations	

	35	Problems	Refer Book 4
	36	Capacity of reservoirs	
	37	Mass haul diagrams.	
UNIT V THEODOLITE SURVEYING			
IX	38	Theodolite , Types	Refer Book 4
	39	Description ,Horizontal and vertical angles	
	40	Temporary and permanent adjustments	
	41	Heights and distances	
	42	Tangential and Stadia Tacheometry	
X	43	Problems	
	44	Subtense method	
	45	Stadia constants	
	46	Anallactic lens.	
	47	Problems	

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CE6311 **SURVEY PRACTICAL I** **L T P C**
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OBJECTIVES:

At the end of the course the student will posses knowledge about Survey field techniques

LIST OF EXPERIMENTS:

1. Study of chains and its accessories
2. Aligning, Ranging and Chaining
3. Chain Traversing
4. Compass Traversing
5. Plane table surveying: Radiation
6. Plane table surveying: Intersection
7. Plane table surveying: Traversing
8. Plane table surveying: Resection – Three point problem
9. Plane table surveying: Resection – Two point problem
10. Study of levels and leveling staff
11. Fly leveling using Dumpy level
12. Fly leveling using tilting level
13. Check leveling
14. LS and CS
15. Contouring
16. Study of Theodolite

TOTAL: 60 PERIODS

OUTCOMES:

Students completing this course would have acquired practical knowledge on handling basic survey instruments including leveling and development of contour map of given area.

REFERENCES:

1. James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice, 7th Edition, McGraw Hill, 2001.
2. Bannister and S. Raymond, "Surveying", 7th Edition, Longman 2004.
3. Roy S.K., "Fundamentals of Surveying", 2nd Edition, Prentice‟ Hall of India, 2004.
4. Arora K.R., Surveying Vol I & II, Standard Book house , 10th Edition 2008

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

Sl. No.	Description of Equipment	Quantity
1.	Total Station	3 Nos
2.	Theodolites	Atleast 1 for every 5 students
3.	Dumpy level	Atleast 1 for every 5 students
4.	Plane table	Atleast 1 for every 5 students
5.	Pocket stereoscope	1
6.	Ranging rods	1 for a set of 5 students

7.		
8.	Cross staff	
9.	Chains	
10.	Tapes	
11.	Arrows	
12.	Prismatic Compass	3 Nos.
13.	Surveyor Compass	1 No.