MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN

Department of Civil Engineering

Name of the Subject	Surveying	Name of the handling Faculty	Mr. R.B. Rakesh
Subject Code	CE8351	Year / Sem	II/III
Acad Year	2021-2022	Batch	2020-2024

Course Objective

- Introduce the rudiments of plane surveying and geodetic principles to Civil Engineers.
- Learn the various methods of plane and geodetic surveying to solve the real world Civil Engineering problems
- Introduce the concepts of Control Surveying
- Introduce the basics of Astronomical Surveying

Course Outcome

- Explain uses of various surveying instruments and mapping
- Solve Horizontal angle and vertical angle using different instruments
- Demonstrate Methods of Leveling and setting Levels with different instruments
- Describe astronomical surveying and methods to determine time, longitude, latitude and azimuth
- Explain the Concept and principle of modern surveying.

Lesson Plan

Sl. No.	Topic(s)	T / R* Book	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc)	Blooms Level (L1-L6)	CO	PO
UNIT I FUNDAMENTALS OF CONVENTIONAL SURVEYING AND LEVELLING							
1	Classifications and basic principles of surveying- Equipment and accessories for ranging and chaining	T1 ,T2	2	BB,PPT	L2	CO1	PO1-PO2
2	Equipment and accessories for ranging and chaining	T1	1	BB,PPT	L2	CO1	PO1-PO2
3	Methods of ranging - Compass Types of Compass-	T1	1	BB,PPT	L2	CO1	PO1-PO2
4	Basic Principles- Bearing – Types - True Methods of ranging -	T1,T2	1	BB,PPT	L2	CO1	PO1-PO2
5	Compass Types of Compass- Basic Principles- Bearing – Types - True	T1,T2	1	BB,PPT	L2	CO2	PO1-PO2
6	types of crops-Levelling- Principles and theory of Levelling – Datum-	T1,T2	1	BB,PPT	L3	CO1	PO1-PO2
7	Bench Marks – Temporary and Permanent Adjustments	T1,T2	1	BB,PPT	L2	CO2	PO1-PO2
8	Methods of Levelling- Booking – Reduction - Sources of errors in Levelling - Curvature and refraction.	T1,T2	1	BB	L3	CO1	PO1-PO2
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							**Quiz**
Evaluation method - MCQ							
UNIT II THEODOLITE AND TACHEOMETRIC SURVEYING							
9	Horizontal and vertical angle measurements	T1	1	PPT	L3	CO2	PO1,PO5

10	Temporary and permanent adjustments	T2	1	NPTEL	L3	CO2	PO1,PO5
11	Heights and distances	T1,T2	1	NPTEL	L3	CO2	PO1,PO5
12	Tacheometer - Stadia Constants - Analytic Lens	T2	1	PPT	L3	CO2	PO1,PO5
13	Tangential and Stadia Tacheometry surveying -	T1,T2	1	BB,PPT	L3	CO2	PO1,PO5
14	Contour – Contouring – Characteristics of contours	T1,	1	BB,PPT	L3	CO2	PO1-PO3
15	Methods of contouring –	T1,T2	1	BB,PPT	L3	CO2	PO1-PO3
16	Tacheometric contouring -	T1	1	BB,PPT	L3	CO2	PO1-PO3
17	Contour gradient – Uses of contour plan and map	T1,T2	1	BB,PPT	L3	CO2	PO1-PO3
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Tutorial							
Evaluation method - PPT based							
UNIT III CONTROL SURVEYING AND ADJUSTMENT							
18	Horizontal and vertical control – Methods	T1	2	NPTEL	L3	CO3	PO1-PO3
19	specifications – triangulation- baseline	T2	2	NPTEL	L3	CO3	PO1-PO3
20	satellite stations – reduction to centre	T2	1	NPTEL	L3	CO3	PO1-PO3
21	trigonometrical levelling – single and reciprocal observations	T1	2	PPT	L3	CO3	PO1,PO5
22	traversing – Gale's table.	T2	2	BB,PPT	L3	CO3	PO1-PO3
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Assignment on problems based on trignometric levelling							
Evaluation method - Paper based							
UNIT IV ADVANCED TOPICS IN SURVEYING							
23	Hydrographic Surveying – Tides	T1	1	PPT	L2	CO4	PO1-PO3
24	MSL – Sounding methods –	T1	1	PPT	L2	CO4	PO1-PO2
25	Strength of fix – astronomical Surveying	T1	1	PPT	L2	CO4	PO1-PO2
26	Field observations and determination of Azimuth by altitude and hour angle methods	T1	1	PPT	L3	CO4	PO1-PO3
27	Astronomical terms and definitions	T2	1	PPT	L2	CO4	PO1-PO2
28	Motion of sun and stars - Celestial coordinate systems	T2	1	NPTEL	L2	CO4	PO1-PO2
29	different time systems - Nautical Almanac	T2	1	PPT	L2	CO4	PO1-PO2
30	Field observations and determination of time, longitude, latitude	T2	1	PPT	L3	CO4	PO1-PO3
31	azimuth by altitude and hour angle method	T2	1	PPT	L3	CO4	PO1-PO3
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Quiz							
Evaluation method - MCQ							
UNIT V MODERN SURVEYING							
32	Total Station : Advantages - Fundamental quantities measured	T2	1	PPT	L3	CO5	PO1,PO5
33	Parts and accessories - working principle - On board calculations - Field procedure	T2	2	BB,PPT	L3	CO5	PO1,PO5
34	Errors and Good practices in using Total Station GPS Surveying	T2	1	PPT	L3	CO5	PO1,PO5

35	Different segments - space, control and user segments	T2	1	BB,PPT	L2	CO5	PO1,PO5
36	satellite configuration - signal structure	T2	1	PPT	L2	CO5	PO1,PO5
37	Orbit determination and representation	T2	1	BB,PPT	L2	CO5	PO1,PO5
38	Anti Spoofing and Selective Availability - Task of control segment	T1,T2	1	PPT	L3	CO5	PO1,PO5
39	Hand Held and Geodetic receivers - data processing - Traversing and triangulation.	T1,T2	1	BB,PPT	L3	CO5	PO1,PO5

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Case Studies

Evaluation method - Report Submission

Content Beyond the Syllabus Planned

1	Estimating the height of high rise building using instruments tacheometer and theodolite

Text Books

1	Punmia.B.C., Ashok K.Jain and Arun K Jain , Surveying Vol. I & II, Lakshmi Publications Pvt Ltd, New Delhi, 2005
2	Venkatramaiah, Text book of Surveying, University press, New Delhi, 2014
3	James M. Anderson and Edward M. Mikhail, "Surveying, Theory and Practice", 7th Edition, McGraw Hill, 2001.

Reference Books

1	Alfred Leick, “GPS satellite surveying”, John Wiley & Sons Inc., 3rd Edition, 2004.
2	SatheeshGopi, rasathishkumar, N. madhu, “Advanced Surveying, Total Station GPS and Remote Sensing” Pearson education, 2007
3	Arora K.R.,"Surveying Vol I & II", Standard Book house, 10th Edition 2008

Website / URL References

1	https://nptel.ac.in/courses/105/107/105107122/
2	https://www.slideshare.net/pks12m/control-surveying

Blooms Level

Level 1 (L1) : Remembering Level 2 (L2) : Understanding Level 3 (L3) : Applying	Lower Order Thinking	Fixed Hour Exams	Level 4 (L4) : Analysing Level 5 (L5) : Evaluating Level 6 (L6) : Creating		Higher Order Thinking	Projects / Mini Projects

Mapping syllabus with Bloom’s Taxonomy LOT and HOT

Unit No	Unit Name	L1	L2	L3	L4	L5	L6	LOT	HOT	Total
Unit 1	FUNDAMENTALS OF CONVENTIONAL SURVEYING AND LEVELLING	0	6	2	0	0	0	8	0	8
Unit 2	THEODOLITE AND TACHEOMETRIC SURVEYING	0	0	9	0	0	0	9	0	9
Unit 3	CONTROL SURVEYING AND ADJUSTMENT	0	0	5	0	0	0	5	0	5
Unit 4	ADVANCED TOPICS IN SURVEYING	0	6	3	0	0	0	9	0	9
Unit 5	MODERN SURVEYING	0	3	5	0	0	0	8	0	8
Total		0	15	24	0	0	0	39	0	39
Total Percentage		0	38.46154	61.53846	0	0	0	100	0	100

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2												2
CO2	3	2	2		3									2
CO3	3	2	2		3									2
CO4	3	2	3											2
CO5	3				3									2

Avg	**2.8**	**2**	**2.33**		**3**								**2**
Justification for CO-PO mapping													
CO1	**PO1-PO2,- Analyse and fromulate ranging and leveling in surveying & Design and solution for problems in compass-bearings**												
CO2	**PO1-PO3- Analyse and fromulate tacheometric and theodalite angle measurements, PO5- Instrument study on theodolite & tacheometric techniques and instruments used in**												
CO3	**PO1-PO3- knowledge in triangulation and satellite stations PO5- techniques used for modern triangulation methods**												
CO4	**PO1 - PO3- Understanding the azimuth,celestial objects & demonstrate the knowledge in nautical and celestial bodies**												
CO5	**PO1, PO5-Adequate knowledge & demonstration in modern surveying instruments ie., total station, gps etc,**												
3	**High level**			**2**	**Moderate level**			**1**	Low level				
Name & Sign of Faculty Incharge : RAKESH R B													
Name & Sign of Subject Expert :													
Head of the Department :													

Format No :231