
	SRI VIDYA COLLEGE OF ENGINEERING & TECHNOLOGY COURSE PLAN (THEORY)	
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ACADEMIC YEAR: 2017-2018

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Subject Code	CE8351			L	P	T	C
Subject Title	SURVEYING			3	0	0	3
Year / Dept / Sem	II/CIVIL/III		Regulation Year		2017		
Faculty Name / Desg / Dept	Mr. J. SEYON RAJA., M.E./ASSISTANT PROFESSOR/CIVIL						
Course Prerequisite	This course is intended to foster advanced knowledge in engineering surveying. It provides exposure to contemporary and emerging techniques and technologies as well as current industry standards. Aspects of specialized engineering surveying, earthworks calculations, set-out and mining and hydro-graphic surveying are all addressed. You will be introduced to a large range of specialized surveying instruments.						

CE8351**SURVEYING****L T P C****3 0 0 3****OBJECTIVES :**

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

UNIT I FUNDAMENTALS OF CONVENTIONAL SURVEYING AND LEVELLING**9**

Classifications and basic principles of surveying - Equipment and accessories for ranging and chaining - Methods of ranging - Compass - Types of Compass - Basic Principles- Bearing – Types - True Bearing - Magnetic Bearing - Levelling- Principles and theory of Levelling – Datum-
 - Bench Marks – Temporary and Permanent Adjustments- Methods of Levelling- Booking – Reduction - Sources of errors in Levelling - Curvature and refraction.

UNIT II THEODOLITE AND TACHEOMETRIC SURVEYING**9**

Horizontal and vertical angle measurements - Temporary and permanent adjustments - Heights and distances - Tacheometer - Stadia Constants - Analytic Lens -Tangential and Stadia Tacheometry surveying - Contour – Contouring – Characteristics of contours – Methods of contouring – Tacheometric contouring - Contour gradient – Uses of contour plan and map

UNIT III CONTROL SURVEYING AND ADJUSTMENT**9**

Horizontal and vertical control – Methods – specifications – triangulation- baseline – satellite stations – reduction to centre- trigonometrical levelling – single and reciprocal observations – traversing – Gale's table. - Errors Sources- precautions and corrections – classification of errors – true and most probable values - weighed observations – method of equal shifts – principle of least squares - normal equation – correlates- level nets- adjustment of simple triangulation networks.

UNIT IV ADVANCED TOPICS IN SURVEYING**9**

Hydrographic Surveying – Tides – MSL – Sounding methods – Three point problem – Strength of fix – astronomical Surveying – Field observations and determination of Azimuth by altitude and hour angle methods –.Astronomical terms and definitions - Motion of sun and stars - Celestial coordinate systems - different time systems - Nautical Almanac - Apparent altitude and corrections - Field observations and

determination of time, longitude, latitude and azimuth by altitude and hour angle method

UNIT V MODERN SURVEYING

9

Total Station : Advantages - Fundamental quantities measured - Parts and accessories - working principle - On board calculations - Field procedure - Errors and Good practices in using Total Station GPS Surveying : Different segments - space, control and user segments - satellite configuration - signal structure - Orbit determination and representation - Anti Spoofing and Selective Availability - Task of control segment - Hand Held and Geodetic receivers - data processing - Traversing and triangulation.

TOTAL : 45 PERIODS

OUTCOMES :

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

- The use of various surveying instruments and mapping
- Measuring Horizontal angle and vertical angle using different instruments
- Methods of Leveling and setting Levels with different instruments
- Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth
- Concept and principle of modern surveying.

TEXTBOOKS :

1. Kanetkar.T.P and Kulkarni.S.V, Surveying and Levelling, Parts 1 & 2, Pune Vidyarthi Griha Prakashan, Pune, 2008
2. Punmia.B.C., Ashok K.Jain and Arun K Jain , Surveying Vol. I & II, Lakshmi Publications Pvt Ltd, New Delhi, 2005
3. James M. Anderson and Edward M. Mikhail, "Surveying, Theory and Practice", 7th Edition, McGraw Hill, 2001.
4. Bannister and S. Raymond, "Surveying", 7th Edition, Longman 2004.
5. Laurila, S.H. "Electronic Surveying in Practice", John Wiley and Sons Inc, 1993
6. Venkatramaiah, Text book of Surveying, University press, New Delhi, 2014

REFERENCES :

1. Alfred Leick, "GPS satellite surveying", John Wiley & Sons Inc., 3rd Edition, 2004.
2. Guocheng Xu, "GPS Theory , Algorithms and Applications", Springer – Berlin, 2003.
3. SatheeshGopi, rasathishkumar, N. madhu, "Advanced Surveying, Total Station GPS and Remote Sensing" Pearson education, 2007
4. Roy S.K., "Fundamentals of Surveying", 2nd Edition, Prentice Hall of India, 2004.

Arora K.R., "Surveying Vol I & II", Standard Book house, 10th Edition 2008

Course Objectives (CO)	<p>CO1: The students shall be able to understand the advantages of electronic surveying over conventional surveying methods.</p> <p>CO2: The students shall be able to understand the working principle of GPS, its components, signal structure, and error sources.</p> <p>CO3: The students shall be able to understand various GPS surveying methods and processing techniques used in GPS observations</p> <p>CO4: The students shall be able to Develop the ability to appropriately collect, analyze, interpret, and apply survey and survey-related data</p> <p>CO5 The students shall be able to Develop the ability to recognize, analyze, and solve survey and survey-related problems</p> <p>CO6: The students shall be able to Acquire a sound and fundamental understanding of the scientific, mathematical, and engineering principles underlying surveying</p>
Expected Course Outcomes (ECO)	<p>At the end of the course, the students should be able to:</p> <p>ECO1 Gain a basic understanding of the principles and operation of the Global Positioning System.</p>

	ECO2 They Gain the ability to measure differences in elevation, draw and utilize contour plots, and calculate volumes for earthwork.											
Mapping of CO & PO(Specify the PO's) - (Fill the col.s with the legend given below)												
PROGRAM OUTCOMES (Pos)												
Engineering graduates will be able to:												
1. ENGINEERING KNOWIEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.												
2. PROBLEM ANALYSIS: identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principals of mathematics, natural sciences and engineering sciences.												
3. DESIGN/ DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design systems components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural societal, and environmental considerations.												
4. CONDUCT INVESTIGATIONS COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.												
5. MODERN TOOL USAGE: Create, select, and apply appropriate techniques resources, and modern engineering and it tools including production and modeling to complex engineering activities with an understanding of the limitations.												
6.THE ENGINEERING AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practices.												
7. ENVIRONMENT AND SUSTAINABILITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.												
8. ETHICS: Apply ethical principles and commit to professional and responsibilities and norms of the engineering practices.												
9. INDIVIDUAL AND TEAM WORK: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary setting.												
10.COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large such as being able to comprehend and write effectives reports and design documentations, make presentations, and give and receive clear instructions.												
11.PROJECT MANGMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principals and apply these to ones own work as a member and leader in a team to manage project and in multidisciplinary environments.												
12. LIFE LONG LEARNING: Recognize the need for , and have the preparations and ability to engage in independent and lifelong learning in the broadest context of technological change												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	3	-	-	-	-	-	-	-
CO3	1	-	2	-	-	-	-	-	-	-	-	-
CO4	-	2	3	-	-	-	-	-	-	-	-	-
CO5	1	-	2	-	-	-	-	-	-	-	-	-
CO6	-	2	-	-	-	-	-	-	-	-	-	-
1 – Slight2 –Moderate3 – High												
Bridging the Curriculum Gap (Additional Topics beyond syllabus/Seminars/Assignments)				BCG1: ADVANCED INSTRUMENTS IN SURVEYING BCG2: ADVANCED SURVEYING TECHNIQUES BCG3: ASTRONOMICAL SURVEY APPLICATIONS								

Related Website URLs	W1: www.rejinpaul.com/.../ce6404-surveying-ii-syllabus-notes-question-papers-civil-4th-s... W2: studentskey.in/surveying-ii-notes/ W3: www.nptelvideos.in/2012/11/surveying.html
Related Video Course Materials (min. 3 no.s)	V1: : www.nptelvideos.in/2012/11/surveying.html V2 : www.aboutcivil.org/surveying-levelling%20II.html V3: freevideolectures.com > Civil Engineering > IIT Kanpur

S.No	Topic Name	Book	Mode of delivery	No of hrs	Cumulative hrs
1.	Unit I - Introduction- Classifications And Basic Principles Of Surveying	T2	Class room teaching	1	1
2.	Equipment And Accessories For Ranging And Chaining- Methods Of Ranging	T2	Class room teaching	1	2
3.	Compass - Types Of Compass	T2	Class room teaching	1	3
4.	Basic Principles- Bearing	T2	Class room teaching	1	4
5.	Types - True Bearing - Magnetic Bearing	T2	Class room teaching	1	6
6.	Levelling- Principles And Theory Of Levelling – Datum- Bench Marks	T2	Class room teaching	2	8
7.	Temporary And Permanent Adjustments- Methods Of Levelling- Booking – Reduction - Sources Of Errors In Levelling - Curvature And Refraction	T2	Class room teaching	2	9
8.	Unit II - Introduction- Horizontal And Vertical Angle Measurements	T2	Class room teaching	1	10
9.	Temporary And Permanent Adjustments - Heights And Distances	T2	Class room teaching	1	11
10.	Tacheometer - Stadia Constants - Analytic Lens	T2	Class room teaching	1	12
11.	Tangential And Stadia Tacheometry Surveying	T2	Class room teaching	1	13
12.	Contour – Contouring – Characteristics Of	T2	Class room teaching	1	14

	Contours				
13.	Methods Of Contouring	T2	Class room teaching	1	15
14.	Tacheometric Contouring–	T2	Class room teaching	1	16
15.	Contour Gradient	T2	Class room teaching Video presentation	1	17
16.	Uses Of Contour Plan And Map	T2	Class room teaching,	1	18
17.	Unit III - Introduction- Horizontal And Vertical Control	T2	Class room teaching, PPT	1	19
18.	Methods – Specifications – Triangulation	T2	Class room teaching PPT	1	20
19.	Baseline – Satellite Stations – Reduction To Centre- Trigonometrical Levelling	T2	Class room teaching PPT	1	21
20.	Single And Reciprocal Observations – Traversing – Gale’s Table.	T2	Class room teaching PPT	1	22
21.	Errors Sources- Precautions And Corrections – Classification Of Errors	T2	Class room teaching, PPT	1	23
22.	True And Most Probable Values - Weighed Observations	T2	Class room teaching PPT	1	24
23.	Method Of Equal Shifts – Principle Of Least Squares	T2	Class room teaching PPT	1	25
24.	Normal Equation – Correlates	T2	Class room teaching PPT	1	26
25.	Level Nets- Adjustment Of Simple Triangulation Networks.	T2	Class room teaching PPT	1	27
26.	Unit Iv - Introduction- Hydrographic Surveying – Tides	T2	Class room teaching & PPT	1	28

27.	MSL – Sounding Methods – Three Point Problem	T2	Class room teaching & PPT	1	29
28.	Strength Of Fix – Astronomical Surveying	T2	Class room teaching & PPT	1	30
29.	Field Observations And Determination Of Azimuth By Altitude And Hour Angle Methods	T2	Class room teaching & PPT	1	31
30.	Astronomical Terms And Definitions - Motion Of Sun And Stars	T2	Class room teaching & PPT	1	32
31.	Celestial Coordinate Systems - Different Time Systems	T2	Class room teaching & PPT	1	33
32.	Nautical Almanac - Apparent Altitude And Corrections -	T2	Class room teaching & PPT	1	34
33.	Field Observations And Determination Of Time, Longitude, Latitude And Azimuth By Altitude And Hour Angle Method	T2	Class room teaching & PPT	2	36
34.	Unit V - Introduction- Total Station : Advantages - Fundamental Quantities Measured	T2	Class room teaching	1	37
35.	Parts And Accessories - Working Principle - On Board Calculations	T2	Class room teaching	1	38
36.	Field Procedure - Errors And Good Practices In Using Total Station GPS Surveying	T2	Class room teaching	1	39
37.	Different Segments - Space, Control And User Segments	T2	Class room teaching	1	40
38.	Satellite Configuration - Signal Structure	T2	Class room teaching	1	41
39.	Orbit Determination And Representation	T2	Class room teaching & PPT	1	42
40.	Anti Spoofing And Selective Availability - Task Of Control Segment	T2	Class room teaching & PPT	1	43

41.	Hand Held And Geodetic Receivers - Data Processing -	T2	Class room teaching & PPT	1	44
42.	Traversing And Triangulation.	T2	Class room teaching& PPT	1	45

	<i>Prepared by</i>	<i>Approved by</i>
Name	Mr. J. SEYON RAJA	Mr. P. SURESH KUMAR
Designation	Assistant Professor / CIVIL	Professor & HOD (Dept)
Sign with date		

LEGEND:**METHODOLOGY TO MAP OBJECTIVE WITH OUTCOME**

Course outcomes are achieved through

- a. Suitable Analogies.
- b. Class room teaching.
- c. Assignments.
- d. Tutorials
- e. Weekly, monthly and model exams.
- f. Brain storming.
- g. Group discussion and role play.
- h. Seminars