

SURVEYING & GEOMATICS

III Semester: CE																				
Course Code	Category	Hours / Week			Credits	Maximum Marks														
		L	T	P		C	CIA	SEE	Total											
ACEB01	Core	3	-	-	3	30	70	100												
		Contact Classes: 45		Tutorial Classes: Nil		Practical Classes: Nil		Total Classes: 45												
I. COURSE OVERVIEW:																				
<p>Surveying is the technique, profession, science and art of making all essential measurements to determine the relative position of points or physical and cultural details above, on, or beneath the surface of the Earth, and to depict them in a their objectives. Surveyors use elements of mathematics (geometry and trigonometry), physics, engineering and law. Surveyor measures certain dimensions that generally occur on the surface of the Earth. Surveying equipment, such as levels and theodolites, are used for accurate measurement of angular deviation, horizontal, usable form, or to establish the position of points or details. These points are usually on the surface of the earth, and they are often used to establish land maps and boundaries for ownership or governmental purposes. To accomplish vertical and slope distances with computerization, electronic distance measurement (EDM), total stations, remotes sensing, Photogrammetry, GPS surveying and laser scanning have supplemented to a large extent.</p>																				
II. OBJECTIVES:																				
The course should enable the students to:																				
<p>I. Describe the function of surveying in civil engineering construction, II. Work with survey observations, and perform calculations, III. Identify and calculate the errors in measurements and to develop corrected values for differential level circuits, horizontal distances and angles for open or closed-loop traverses, IV. Operate an automatic level to perform differential and profile leveling; properly record notes; mathematically reduce and check levelling measurements.</p>																				
III. COURSE OUTCOMES (COs):																				
<table border="0"> <thead> <tr> <th style="text-align: left;">COs</th> <th style="text-align: left;">Course Outcome</th> </tr> </thead> <tbody> <tr> <td>CO 1</td> <td>Explore the importance of Linear, angular and graphical methods involved in surveying to make a plan or map.</td> </tr> <tr> <td>CO 2</td> <td>Understand various method of curve setting and Elements of curves at various locations</td> </tr> <tr> <td>CO 3</td> <td>Analyse Co-ordinate transformation and accuracy considerations with GPS</td> </tr> <tr> <td>CO 4</td> <td>Analyse photographic mapping, mapping using paper prints, stereo plotting instruments, mosaics and map substitutes.</td> </tr> <tr> <td>CO 5</td> <td>Summarize the concept of interaction of electromagnetic radiation with the atmosphere and earth surface</td> </tr> </tbody> </table>									COs	Course Outcome	CO 1	Explore the importance of Linear, angular and graphical methods involved in surveying to make a plan or map.	CO 2	Understand various method of curve setting and Elements of curves at various locations	CO 3	Analyse Co-ordinate transformation and accuracy considerations with GPS	CO 4	Analyse photographic mapping, mapping using paper prints, stereo plotting instruments, mosaics and map substitutes.	CO 5	Summarize the concept of interaction of electromagnetic radiation with the atmosphere and earth surface
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IV. SYLLABUS:																				
MODULE - I		INTRODUCTION TO SURVEYING					Classes: 09													
Principles, Linear, angular and graphical methods, Survey stations, Survey lines ranging, bearing of survey lines, levelling: Plane table surveying, Principles of levelling booking and reducing levels; differential, reciprocal levelling, profile levelling and cross sectioning. Digital and Auto Level, Errors in levelling;																				

contouring: Characteristics, methods, uses; areas and volumes. Triangulation and Trilateration Theodolite survey: Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control methods, triangulation network signals. Baseline choices instruments and accessories extension of base lines corrections Satellite station reduction to centre, Inter visibility of height and distances, Trigonometric levelling, Axis single corrections.		
MODULE - II	CURVES	Classes: 07
Elements of simple and compound curves, Method of setting out, Elements of Reverse curve, Transition curve, length of curve, Elements of transition curve, Vertical curves.		
MODULE - III	MODERN FIELD SURVEY SYSTEMS	Classes: 09
Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Distomat, Total Station, Parts of a Total Station, Accessories, Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey.		
Global Positioning Systems (GPS), Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations.		
MODULE - IV	PHOTOGRAMMETRIC SURVEYING	Classes: 08
Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping aerial triangulation, radial triangulation, methods; photographic mapping, mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes.		
MODULE - V	REMOTE SENSING	Classes: 12
Introduction, Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition: platforms and sensors; visual image interpretation; digital image processing.		
V. Text Books:		
<ol style="list-style-type: none"> 1. Madhu, N, Sathikumar, R and Satheesh Gobi, “Advanced Surveying: Total Station, GIS and Remote Sensing”, Pearson India, 2nd Edition, 2006. 2. Manoj, K. Arora and Badjatia, “Geomatics Engineering”, Nem Chand & Bros, 2011. 3. Bhavikatti, S.S., “Surveying and Levelling”, I.K. International, Vol. I and II, 2010. 		
VI. Reference Books:		
<ol style="list-style-type: none"> 1. Chandra, A.M., “Higher Surveying”, New Age International (P) Limited, 3rd Edition, 2002. 2. Anji Reddy, M., “Remote sensing and Geographical information system”, B. S. Publications, 2001. 3. Arora, K.R., “Surveying”, Standard Book House, Vol-I, II and III, 2015. 		
VII. Web References:		
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/105104100/43 2. https://www.coloradomesa.edu/wccc/programs/land-surveying-geomatics.html. 3. https://books.google.co.in/books?id=FaCgAAQBAJ&printsec=frontcover&dq=surveying+and+geomatics+ONLINE+text+books&hl=en&sa=X&ved=0ahUKEwi1wP3x24HgAhUJ5o8KHS2EDzkQ6AEIMzAB#v=onepage&q&f=false 		

VIII. E-Text Books:

1. <https://www.jntubook.com/surveying-textbook-free-download>.
2. <http://www.freeengineeringbooks.com/Civil/Surveying-Books.php>
3. <https://www2.unb.ca/gge/Study/Undergraduate/Handbook.pdf>