

SURVEYING & GEOMATICS

III Semester: CE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACEB01	Core	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45		Tutorial Classes: 15		Practical Classes: Nil			Total Classes: 60	
<p>COURSE OBJECTIVES: The course should enable the students to:</p> <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> <p>COURSE OUTCOMES (COs):</p> <p>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: Analyze 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</p> <p>COURSE LEARNING OUTCOMES (CLOs):</p> <ol style="list-style-type: none"> 1. Analyze the sources of errors in linear measurements. 2. Obtain the direction of a surveying line with a prismatic and surveyors compass 3. Explain the importance of theodolite and understand the principle of measuring angles in horizontal and vertical plains. 4. Draw cross section and prepare a contour maps for road works, rail works, canals etc., 5. Draw and calculate the area enclosed with in the traverse. 6. Use Elements of simple, reverse, transition and compound curves at suitable locations 7. Understand the Method of setting out simple curves, compound curves and reverse curves etc., 8. Calculate length of curve using various methods 9. Analyze geometric design of vertical curve at suitable location. 10. Understand the basic Principle of Electronic Distance Measurement 11. Understand different types of EDM instruments such as Distomat, and Total Station. 12. Summarize the Advantages and Applications Total Station 13. Understand Field Procedure for total station survey and Errors in Total Station Survey. 14. Differentiate the advantages of global positioning system and geographical information system. 15. Analyze Co-ordinate transformation and accuracy considerations with GPS. 16. Understand the basic concepts involved in Photogrammetric surveying. 17. Understand perspective geometry of aerial photograph. 18. Analyze relief and tilt displacements using aerial photogrammetric surveying. 								

<p>19. Explain terrestrial photogrammetry, flight planning, Stereoscopy, ground control extension for photographic mapping by aerial triangulation and radial triangulation methods.</p> <p>20. Analyze photographic mapping, mapping using paper prints, stereo plotting instruments, mosaics and map substitutes</p> <p>21. Understand the basic concept of Electromagnetic Spectrum.</p> <p>22. Summarize the concept of interaction of electromagnetic radiation with the atmosphere and earth surface.</p> <p>23. Analyze remote sensing data acquisition on platforms and sensors.</p> <p>24. Analyze visual image interpretation and digital image processing techniques.</p>		
MODULE-I	INTRODUCTION TO SURVEYING	Classes: 09
<p>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.</p>		
MODULE -II	CURVES	Classes: 07
<p>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.</p>		
MODULE-III	MODERN FIELD SURVEY SYSTEMS	Classes: 09
<p>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.</p> <p>Global Positioning Systems (GPS), Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations.</p>		
MODULE-IV	PHOTOGRAMMETRIC SURVEYING	Classes: 08
<p>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</p>		
MODULE-V	REMOTE SENSING	Classes: 12
<p>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</p>		
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. 		

Reference Books:

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.

Web References:

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>

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>