

Course Coordinator <b>RAJAMOHAN REDDY</b>	<b>E2 – SEM II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>CE: SURVEYING – II</b>	2	1	0	3
	<b>Total Contact Hours– 45</b>				

Course objectives:

1. Introduction to the triangulation method
2. Distinguish the different types of curves and methods of setting curves.
3. Determine the Earth work computation.
4. Train on utilization of surveying instruments like EDM, Total station and GPS.
5. Demonstrate basics of photogrammetry and mapping process.
6. Throw light on remote sensing elements.

## SYLLUBUS

### UNIT-I: **Triangulation** (Contact Hours: 6)

Classification- indivisibility of station – Signals and towers-base line measurements –Corrections – Satellite station and Reduction to center – Basinet. Trigonometric levelling– Elevation of top of the tower same plane, Different planes.

### UNIT II: **Curves** (Contact Hours: 6)

Simple curves – Elements of simple curves – Methods of setting simple curves – Rankin’s method – Two theodolite method – Compound curves – Elements of compound curves.

### UNIT III: **Earthwork** Computations (Contact Hours: 7)

Embankments and cutting for a level section with and without transverse slopes, Simpson’s method, Trapezoidal method, determination of the capacity of reservoir.

### UNIT IV: **Modern Field Survey Systems** (Contact Hours: 10)

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- Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations, Differential GPS, comparison between GPS and DGPS.

### UNIT V: **Photogrammetry Surveying** (Contact Hours: 10)

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.

**UNIT VI: Remote Sensing** (Contact Hours: 6)

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.

\*\*\*\*\* Lecture Plan\*\*\*\*\*

Lecture	Topics to be covered	Contact Hours	Reference	e-Resources	
				Video resources	Study material
	<b>Unit -1: Triangulation</b>	<b>6</b>			
L -1	Classification- indivisibility of station – Signals and towers	1	2,3	<a href="http://www.nptelvideos.in/2012/11/surveying.html">http://www.nptelvideos.in/2012/11/surveying.html</a> .	<a href="https://nptel.ac.in/courses/105/107/105107122/">https://nptel.ac.in/courses/105/107/105107122/</a>
L -2	Base line measurements- Corrections	1	2,3		
L-3	Satellite station Reduction to center	1	2,3		
L-4	Trigonometric levelling	1	2,3		
L-5	Elevation of top of the tower same plane	1	2,3		
L-6	Elevation of top of the tower Different planes	1	2,3		
	<b>Unit II: Curves</b>	<b>6</b>			
L-7	Simple curves – Elements of simple curves	1	2,3	<a href="http://www.nptelvideos.in/2012/11/surveying.html">http://www.nptelvideos.in/2012/11/surveying.html</a> .	<a href="https://nptel.ac.in/courses/105/107/105107122/">https://nptel.ac.in/courses/105/107/105107122/</a>
L-8	Methods of setting simple curves	1	2,3		
L-9	Rankin's method	1	2,3		

L-10	Two theodolite method	1	2,3		
L-11	Compound curves	1	2,3		
L-12	Elements of compound curves	1	2,3		
	<b>Unit III: Earthwork Computations</b>	<b>7</b>			
L-13	Introduction	1	2,3		
L-14	Embankments and cutting for a level section with transverse slopes	1	2,3		
L-15	Embankments and cutting for a level section without transverse slopes	1	2,3		
L-16	Simpson's method	1	2,3		
L-17	Trapezoidal method	1	2,3		
L-18	Determination of the capacity of reservoir	1	2,3		
L-19	Example problems	1	2,3		
	<b>Unit IV: Modern Field Survey Systems</b>	<b>10</b>			
L-20	Principle of Electronic Distance Measurement, Modulation	1	2,3		
L-21	Types of EDM instruments, Distomat	1	2,3		
L-22	Total Station – Parts of a Total Station –Accessories –Advantages and Applications	1	2,3		
L-23,24	Field Procedure for total station survey, Errors in Total Station	2	2,3		
L-25	Global Positioning Systems- Segments	1	2,3		
L-26	GPS measurements, errors and biases	1			
L-27,28	Surveying with GPS, Co-ordinate transformation, accuracy considerations,	2			

L-29	Differential GPS, comparison between GPS and DGPS	1	2,3		
	<b>Unit V: Photogrammetry Surveying</b>	<b>10</b>			
L-30	Introduction	1	2,3	<a href="http://www.nptelvideo.in/2012/11/surveying.html">http://www.nptelvideo.in/2012/11/surveying.html</a>	<a href="https://nptel.ac.in/courses/105/107/105107122/">https://nptel.ac.in/courses/105/107/105107122/</a>
L-31	Basic concepts, perspective geometry of aerial photograph.	1	2,3		
L-32	Relief and tilt displacement.	1	2,3		
L-33	Terrestrial photogrammetry.	1			
L-34	Flight planning; Stereoscopy ground control extension for photographic mapping.	1			
L-35,36	Aerial triangulation, radial triangulation, methods.	2	2,3		
L-37,38,39	Photographic mapping- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes.	3	2,3		
	<b>Unit VI: Remote Sensing</b>	<b>6</b>			
L-40	Introduction –Electromagnetic Spectrum	1	2,3	<a href="http://www.nptelvideo.in/2012/11/surveying.html">http://www.nptelvideo.in/2012/11/surveying.html</a>	<a href="https://nptel.ac.in/courses/105/107/105107122/">https://nptel.ac.in/courses/105/107/105107122/</a>
L-41	Interaction of electromagnetic radiation with the atmosphere and earth surface	1	2,3		
L-42	Remote sensing data acquisition	1	2,3		
L-43	Platforms and sensors	1	2,3		
L-44	Visual image interpretation	1	2,3		
L-45	Digital image processing	1	2,3		

### Course outcomes:

On successful completion of the course, student will be able to do

1. Mapping area using triangulation.
2. Basic idea about different curves using in civil engineering designs.
3. Illustrate Earthwork computation by various methods.
4. Discuss the total station and its practical applications.
5. Understand terrestrial photogrammetry.
6. Carryout data acquisition and interpretation

**Learning resources:**

Text book

1. Dr. K.R. Arora, Surveying, Vol. II, 13th Edition, 2016, Standard Book House, Fifth edition, 2001.
2. Dr.B.C. Punmia, Surveying, Vol. II, 16th Edition, 2016, Laxmi Publications Pvt. Ltd,
3. Dr. A.M.Chandra, Higher Surveying, 2nd Edition, 2006, New Age International Publishers.

**Web Resources:**

1. IIT Kanpur, December 31 2009, “*Surveying*” URL: <http://www.nptelvideos.in/2012/11/surveying.html>.

Assessment Method				
Assessment Tool	Weekly tests	Monthly tests	End Semester Test	Total
Weightage (%)	10%	30%	60%	100%