

**OBJECTIVES:**

- This subject deals with geodetic measurements and Control Survey methodology and its adjustments. The student is also exposed to the Modern Surveying.

**UNIT I CONTROL SURVEYING 9**

Horizontal and vertical control – Methods – specifications – triangulation- baseline – instruments and accessories – corrections – satellite stations – reduction to centre- trigonometrical levelling – single and reciprocal observations – traversing – Gale"s table.

**UNIT II SURVEY ADJUSTMENT 9**

Errors Sources- precautions and corrections – classification of errors – true and most probable values- weighed observations – method of equal shifts –principle of least squares -0 normal equation – correlates- level nets- adjustment of simple triangulation networks.

**UNIT III TOTAL STATION SURVEYING 9**

Basic Principle – Classifications -Electro-optical system: Measuring principle, Working principle, Sources of Error, Infrared and Laser Total Station instruments. Microwave system: Measuring principle, working principle, Sources of Error, Microwave Total Station instruments. Comparis on between Electro-optical and Microwave system. Care and maintenance of Total Station instruments. Modern positioning systems – Traversing and Trilateration.

**UNIT IV GPS SURVEYING 9**

Basic Concepts - 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.

**UNIT V ADVANCED TOPICS IN SURVEYING 9**

Route Surveying - Reconnaissance - Route surveys for highways, railways and waterways - Simple curves – Compound and reverse curves - Setting out Methods – Transition curves - Functions and requirements - Setting out by offsets and angles - Vertical curves - Sight distances- hydrographic surveying – Tides - MSL - Sounding methods - Three-point problem - Strength of fix - Sextants and station pointer- Astronomical Surveying – field observations and determination of Azimuth by altitude and hour angle methods – fundamentals of Photogrammetry and Remote Sensing

**TOTAL: 45 PERIODS****OUTCOMES:**

On completion of this course students shall be able to

- Understand the advantages of electronic surveying over conventional surveying methods
- Understand the working principle of GPS, its components, signal structure, and error sources
- Understand various GPS surveying methods and processing techniques used in GPS observations

**TEXT BOOKS:**

1. James M. Anderson and Edward M. Mikhail, "Surveying, Theory and Practice", 7<sup>th</sup> Edition, McGraw Hill, 2001.
2. Bannister and S. Raymond, "Surveying", 7<sup>th</sup> Edition, Longman 2004.
3. Laurila, S.H. "Electronic Surveying in Practice", John Wiley and Sons Inc, 1993

**REFERENCES:**

1. Alfred Leick, "GPS satellite surveying", John Wiley & Sons Inc., 3<sup>rd</sup> Edition, 2004.
2. Guocheng Xu, " GPS Theory, Algorithms and Applications", Springer - Berlin, 2003.
3. Satheesh Gopi, rasathishkumar, N. madhu, "Advanced Surveying, Total Station GPS and Remote Sensing" Pearson education , 2007