

B.E. Semester: IV
Civil Engineering
Subject Name: ADVANCED SURVEYING (CV401)

A. Course Objective:

The main objectives of the course are

- To make students aware with different advance surveying methodologies applied to carry out large scale survey works as modern instruments have largely changed the approach to survey works with the principles being same.
- To prepare the students to handle the errors they are likely to come across any large scale survey works.

B. Teaching /Examination Scheme

Teaching scheme				Total Credit	Evaluation Scheme					Total
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract/ Tut.	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
03	00	02	05	04	03	70	30	20	30	150

C. Detailed Syllabus

1 Tacheometric Surveying:

Introduction, purpose, principle & use of tacheometry, Instrument used & stadia hairs & Fixed hair methods of tacheometry, Tacheometry constant & Problems Anallatic lens theory, subtense bar, Field work in tacheometry. Reduction of readings, errors and precisions. Difference between Theodolite & Tacheometer.

2. Geodetic Surveying:

Introduction & object of Geodetic Surveying, Principal & classification of triangulation system, Selection of base line and stations, Orders of triangulation-triangulation figures, Station marks and signals-marking signals, Examples on Phase error, Extension of base, reduction of centre, selection and marking of stations

3. Theory of Errors:

Introduction, types of errors, Definitions, Laws of accidental errors, laws of weights, Examples, Theory of least squares, Rules for giving weights and distribution of errors to the field observations, Normal Equations, Determination of the most probable values of quantities Examples on most probable values of quantities.

4. Field Astronomy:

Introduction & Instruments & purpose, Astronomical terms, Time & conversion of time, Abbreviations, Determination of azimuth , Latitude and longitude & Examples of azimuth , Latitude and longitude.

5. Photogrammetric Surveying:

Introduction, principle, uses Aerial camera, aerial photographs Definitions, scale of vertical and tilted photograph Ground coordinates, ground control, examples on scale, Displacements and errors, Examples on Displacement and errors, Procedure of aerial survey, Examples on flight planning, Photomaps and mosaics. Difference between Mosaic & Map, Stereoscopes, Parallax bar, Examples on Parallax bar.

6. Remote Sensing & Geographical Information System:

Introduction, principles of energy interaction in atmosphere and earth surface features, Image interpretation techniques, visual interpretation, Digital image processing, Global positioning system, Types, Applications of GPS, Method of operation, System Segmentation Integration of remote sensing and GIS, applications in civil engineering.

7. Special Survey Instruments:

Introduction, Electromagnetic Distance Measurement, Electronics Theodolite, Total station, Site square, PentaGraph, Autoset Level, Transit level, Special Compasses, Brunton Universal Pocket Transit, Mountain Compass Transit.

D. Lesson Planning

Sr. No.	Title of the Unit	Minimum Hours	Weightage
1.	Tacheometric Surveying	09	22%
2.	Geodetic Surveying	05	8%
3.	Theory of Errors	08	20%
4.	Field Astronomy	05	10%
5.	Photogrammetric Surveying	08	20%
6.	Remote Sensing ,G.P.S. & G.I.S. System	05	10%
7.	Special Survey Instruments	05	10%

E. List of Experiments:

Sr. No.	Name of Experiment
1.	Tacheometric Surveying
2.	Geodetic Surveying
3.	Field Projects

F. Instructional method and pedagogy (Continuous Internal Assessment Scheme) (CIA)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and practical which carries marks.
- At regular intervals assignments will be given. Students should submit all assignments during given period.
- Classroom participation and involvement in solving the problems in Tutorial rooms Carries Marks
- One internal exam of 30 marks is conducted as a part of Mid semester evaluation.
- Experiments shall be performed in the field related to course contents.
- The course includes a practical, where students have an opportunity to build an appreciation for the concept being taught in lectures.

G. Students Learning Outcomes:

- On the successful completion of this course the students will get a diverse knowledge of surveying practices applied for real life problems.
- The students will learn to work with various surveying equipments, like, Theodolite, Total station, etc. in order to apply the theoretical knowledge to carry out practical field work.
- The knowledge of limits of accuracy will be obtained by making measurements with various surveying equipment employed in practice.

H. Recommended Study Materials

(A) Reference Books:

1. Duggal, S. K., Surveying Vol. I & II, Tata Mcgraw Hill, New Delhi
2. Subramanian, R., Surveying & Levelling, Oxford University Press, New Delhi
3. Punamia, B.C., Surveying Vol. I, II & III, Laxmi Publications
4. Kanetkar, T.P. and Kulkarni, S.V., Surveying and Levelling Vol. I & II, Pune Vidhyarthi Gruh
5. Arora, K.R., Surveying Vol. I, II & III, Standard Book House. New Delhi
6. Basak, N.N., Surveying and Levelling, Tata Mcgraw Hill, New Delhi
7. Agor, R., Surveying and Levelling, Khanna Publishers, New Delhi

8. Agor, R. Advanced Surveying, Khanna Publishers, New Delhi
9. Roy, S.K., Fundamentals of Surveying, Prentice Hall India, New Delhi
10. Remote Sensing and GIS by B Bhatia, Oxford University Press, New Delhi.
11. Remote sensing and Image interpretation by T.M Lillesand,. R.W Kiefer and J.W Chipman, 5th edition, John Wiley and Sons India
12. Lo, C.P. & Yeung A.K.W., Concepts and Techniques of Geographic Information Systems, Prentice Hall of India, New Delhi, 2002
13. Anji Reddy, M., Remote Sensing and Geographical Information Systems, B.S.Publications, Hyderabad, 2001

(B) Web Materials:

1. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-ROORKEE/SURVEYING/home.htm>
2. <http://nptel.iitm.ac.in>
3. <http://www.naicc.org>