Devi Ahilya Vishwavidhyalaya, Indore, India **Institute of Engineering & Technology**					**II Year B.Tech. (Civil Engineering)**	
Course Code & Name	**Instructions Hours per Semester and Credits**					
4RVPC3 **Advances surveying**	**Classroom Instruction (CI)**		**Lab Instruction (LI)**	**Term Work (TW) and Self Learning (SL)**	**Total no. of Hours Per semester**	**Total Credits (Total Hours/30)**
	L	**T**	**P**	**TW+SL**		
	20	**10**	**20**	**70**	**120**	**4**

Course Learning Objectives:

1. Advanced Survey Techniques: Mastery of advanced techniques in surveying such as GPS/GNSS, laser scanning, digital photogrammetry, and remote sensing technologies.
2. Data Analysis and Interpretation: Ability to analyze and interpret complex survey data using statistical methods, GIS (Geographical Information Systems), and CAD (Computer Aided Design) software.
3. Surveying in Challenging Environments: Proficiency in conducting surveys in challenging environments such as urban areas, mountainous regions, or underwater using specialized equipment and techniques.
4. Innovation: To create the environment for innovative and smart ideas for generations of professionals to serve the nation and world with latest technologies in Civil Engineering

Prerequisites:

COURSE CONTENTS

UNIT-I Modern equipment for surveying: Digital levels and theodolites, Electronic Distance measurement (EDM), Total Station and Global Positioning Systems (GPS), and Digital Planimeter.

UNIT-II Surveying Astronomy: Definitions of astronomical terms, coordinate systems for locating heavy bodies, geographic, geodetic, geocentric, Cartesian, local and projected coordinates for earth resources mapping, convergence of meridian, parallel of latitude, shortest distance between two points on the earth, determination of latitude and longitude.

UNIT-III GPS Surveying: Introduction & components of GPS, Space segment, control seg ment and user segment, Elements of Satellite based surveys-Map datums, GPS receivers, GPS observation methods and their advantages over conventional methods. Digital Terrain Model (DTM): Topographic representation of the terrain and generation of DTM on computers using spot heights and contour maps.

UNIT-IV Photogrammetry: Principle, definitions and classifications of terrestrial and aerial photogrammetry, flight planning for aerial photography, scale and relief displacements of vertical aerial photographs, stereoscopic vision on vertical photographs, computation of position, length and elevations of objects using photographs and photo mosaic.

UNIT-V Remote Sensing: Principle, components, classification, remote sensing data acquisition process, different types of remote sensing satellite imagery with special relevance to Indian

Remote Sensing Satellites (IRS) and applications. Geographic Information Systems (GIS) : Definition, components and advantages.

Course Outcomes:

CO. No.	CO	PO
CO1	Modern equipment for surveying	PO-5, PO-9
CO2	Surveying Astronomy	PO-2, PO-4
CO3	GPS Surveying	PO-5, PO-9
CO4	Photogrammetry	PO-1, PO-2, PO-4
CO5	Remote Sensing	PO-5, PO-12

BOOKS RECOMMENDED:

1. C.P. Lo, Albert K. W. Yeung, Concepts and Techniques of Geographic Information Systems, Prentice Hall India Pvt. Ltd, New Delhi, 2002.
2. Kang-Tsung Chang, Introduction to Geographic Information Systems, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2008.
3. Gopi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson Education India, 2007.
4. Punmia B. C, Ashok K. Jain, Arun K. Jain, Higher Surveying, Laxmi Publications, 2005.
Remote Sensing and image interpretation by Lillesand T.M. and Kiefer R.W.

CO-PO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO 1	PSO 2	PSO 3
4RVPC3.CO1					3				3			2	3	2
4RVPC3.CO2		3		3								2	3	3
4RVPC3.CO3					3				2			2	3	3
4RVPC3.CO4	2	3		3								2	3	1
4RVPC3.CO5					3						3	3	3	2

List of Practical Assignment:

1. **Study and Handling of Digital Level & Theodolite:** Calibration, measurement of angles, and levelling exercises.
2. **Electronic Distance Measurement (EDM) Practical:** Measurement of linear distances using EDM and comparison with tape measurements.
3. **Total Station Survey:** Setting up, data collection, and plotting coordinates for a small area.
4. **Digital Planimeter Exercise:** Measurement of irregular areas from maps using a digital planimeter.
5. **Determination of Latitude and Longitude:** Using astronomical observations (sun/star method or simulation software).
6. **Calculation of Shortest Distance Between Two Points on Earth:** Practical exercise using spherical trigonometry and coordinate systems.
7. **GPS Receiver Handling and Data Collection:** Recording coordinates of selected points and transferring data to mapping software.
8. **Preparation of Digital Terrain Model (DTM):** Using spot heights and contour data to generate terrain representation on computer.

9. **Stereoscopic Vision Exercise:** Interpretation of vertical aerial photographs using stereoscope to determine elevations.
10. **Photogrammetric Computation:** Calculation of scale, relief displacement, and object dimensions from aerial photographs.
11. Interpretation of satellite imagery (IRS data) for land use classification.
12. Introduction to GIS software: plotting and overlaying thematic maps.