

B.TECH CIVIL ENGINEERING – R22

Advanced Field Survey

SEMESTER V

**L/T/P/C
3/0/0/S**

Unit 1: Fundamentals of Advanced Surveying

- Principles of surveying and geodetic concepts
- Classification of surveys (land, hydrographic, engineering)
- Modern instruments in surveying (total station, GPS, drones)
- Errors in surveying and methods of correction
- Importance of advanced surveys in civil engineering projects

Unit 2: Advanced Surveying Instruments and Techniques

- Electronic distance measurement (EDM)
- Total station operation and applications
- GPS/GNSS surveying methods
- Drone-based aerial surveying and photogrammetry
- Data acquisition and accuracy considerations

Unit 3: Field Survey Methods and Applications

- Triangulation and trilateration methods
- Levelling techniques (digital and auto levels)
- Contour mapping and topographic surveys
- Hydrographic and tunnel surveys
- Case studies of advanced field surveys in infrastructure projects

Unit 4: Data Processing and Analysis

- Survey data management and processing software
- GIS integration with survey data
- Remote sensing applications in field surveys

- Error analysis and adjustment of survey data
- Preparation of survey reports and maps

Unit 5: Emerging Trends and Professional Practices

- Automation in surveying (robotic total stations, AI integration)
- Role of BIM in survey data utilization
- Legal and ethical aspects of surveying practice
- Sustainable surveying practices
- Future challenges and opportunities in advanced field surveys

Course Outcomes (COs):

CO1: Explain the principles and importance of advanced field surveying in civil engineering projects.

CO2: Operate modern surveying instruments such as total stations, GPS, and drones effectively.

CO3: Apply advanced field survey methods to collect and analyze data for diverse civil engineering applications.

CO4: Integrate survey data with GIS and remote sensing tools for accurate mapping and analysis.

CO5: Evaluate emerging trends, professional practices, and sustainability aspects in advanced field surveying