

**SANT GADGE BABA AMRAVATI UNIVERSITY,
AMRAVATI**

(As Per National Education Policy-NEP-2020)

Commencement Year-2024-2025

Revised From- 2026-27

Skill Enhancement Course (SEC)

Subject: Geography

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam. Duration	Max. Marks
4.5	I	622276	Skill Enhancement Course (SEC) I Total Station Surveying	2	60 Hours	2 Hrs.	External-30 Internal-20 Total-50
Course Objectives:		1. To understand the principles of Total Station Surveying. 2. To develop practical skills in operating Total Station instruments. 3. To conduct field surveys and collect spatial data. 4. To prepare maps and plans using survey data.					
Course Outcomes:		1. To understand the principles and components of Total Station instruments used in modern surveying. 2. To develop skills in operating and handling Total Station equipment for field data collection. 3. To learn methods of measuring distances, angles, and coordinates accurately using Total Station. 4. To apply Total Station surveying techniques for topographic mapping, contouring, and construction surveys. 5. To process, analyze, and interpret survey data for preparation of maps, plans, and engineering projects.					
Unit System		Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies		
Unit I		Introduction to Total Station Surveying Meaning and importance of surveying 1. Conventional and modern surveying methods 2. Introduction to Total Station 3. Components and functions of Total Station 4. Applications of Total Station in Geography	16 Hrs.	8 Marks	Incorporation of Pedagogies • Lecture Method: Introduction of surveying concepts and principles. • Demonstration: Demonstration of Total Station setup and operation. • Experiential Learning: Hands-on field training and survey practice. • Project-Based Learning: Preparation of survey maps and reports. • ICT-Based Learning: Use of GIS, AutoCAD, and survey software. • Collaborative Learning: Group		
Unit II		Instrument Setup and Measurement Techniques 1. Setting up the tripod and instrument 2. Centering and	14 Hrs.	7 Marks			

	leveling 3.Instrument adjustments and calibration 3.Measurement of horizontal and vertical angles 4.Electronic Distance Measurement (EDM) 4.Coordinate measurement and data recording			surveys, discussions, and presentations.
Unit III	Field Survey Applications 1.Traverse survey 2.Topographical survey 3.Boundary survey 4.Route and campus survey 5.Collection of field data using Total Station	16 Hrs.	8 Marks	
Unite IV	Data Processing, Mapping and Project Work 1.Downloading and transferring survey data 2.Data processing and editing 3.Preparation of maps and plans 4.Area calculation 5.Preparation of survey report and project presentation	14 Hrs.	7 Marks	

References:	1) Basak, N. N. (2017). Surveying and Levelling. McGraw Hill Education, New Delhi. 2) Gopi, S., Sathikumar, R., & Madhu, N. (2007). Advanced Surveying: Total Station, GIS and Remote Sensing. Pearson Education, New Delhi. 3) Punmia, B. C., Jain, A. K., & Jain, A. K. Surveying (Vol. I & II). Laxmi Publications, New Delhi. 4) Schofield, W., & Breach, M. Engineering Surveying. Butterworth-Heinemann, Oxford. 5) Ghilani, C. D., & Wolf, P. R. Elementary Surveying: An Introduction to Geomatics. Pearson Education. 6) Bannister, A., Raymond, S., & Baker, R. Surveying. Pearson Education. Online Resources 7) Survey of India 8) National Remote Sensing Centre (NRSC) 9) ISRO Bhuvan Geoportal 10) NPTEL Online Courses on Surveying and Geomatics 11) QGIS Documentation and Training Manual
Internal Assessment (20 Marks)	1. Setting up and adjusting the Total Station for accurate surveying. 2. Measuring angles and distances using the Total Station. 3. Conducting coordinate surveys of selected points. 4. Performing traverse surveys and plotting the results. 5. Calculating area using Total Station data. 6. Preparing a campus or field survey map from collected survey data.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam. Duration	Max. Marks
4.5	II	622277	Skill Enhancement Course (SEC) II GPS Surveying	2	60 Hrs.	2 Hrs.	External-30 Internal-20 Total-50
Course Objectives:		1. To understand the principles and applications of GPS in surveying. 2. To develop skills in GPS data collection and mapping. 3. To introduce GPS-based spatial data acquisition techniques. 4. To apply GPS in geographical studies and field surveys. Based on standard GPS surveying curricula and geospatial training programs.					
Course Outcomes:		1. Operate GPS devices for field data collection and positioning. 2. Collect and record spatial coordinates accurately using GPS. 3. Apply GPS techniques in mapping, navigation, and surveying. 4. Interpret GPS data and prepare basic maps and survey reports					
Unit System		Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies		
Unit I		Introduction to GPS Surveying: 1. Concept and importance of GPS 2. History and development of GPS 3. Components of GPS: Space Segment, Control Segment, User Segment 4. Coordinate systems and map datums 5. Applications of GPS in Geography and Surveying	16 Hrs.	8 Marks	• Lecture and Discussion • Demonstration Method • Field-Based Experiential Learning • ICT-Based Learning (GPS Software and GIS)Project-Based Learning		
Unit II		GPS Equipment and Data Collection: 1. GPS receivers and accessories 2. Handheld GPS and GNSS devices 3. Waypoint, route, and track recording 4. Field procedures for GPS survey 5. Sources of errors and accuracy in GPS measurements	14 Hrs.	7 Marks			

Unit III	GPS Survey Techniques : 1. Static and Kinematic GPS Survey 2. Differential GPS (DGPS) 3. Real-Time Kinematic (RTK) Survey 4. Collection of coordinates and field observations 5. GPS-based topographic and land surveys)	16 Hrs.	8 Marks	
Unit IV	Data Processing and Applications: 1. Downloading and processing GPS data 2. GPS and GIS integration 3. Preparation of maps using GPS data 4. Applications in land use mapping, resource management, and navigation	14 Hrs.	7 Marks	
References:	1. Gopi, S., Sathikumar, R., & Madhu, N. (2017). <i>Advanced Surveying: Total Station, GPS and Remote Sensing</i>. Pearson Education. 2. Hofmann-Wellenhof, B., Lichtenegger, H., & Wasle, E. (2008). <i>GNSS – Global Navigation Satellite Systems: GPS, GLONASS, Galileo and More</i>. Springer. 3. Misra, P., & Enge, P. (2011). <i>Global Positioning System: Signals, Measurements and Performance</i>. Ganga-Jamuna Press. 4. Kaplan, E. D., & Hegarty, C. J. (2017). <i>Understanding GPS/GNSS: Principles and Applications</i>. Artech House. 5. Chandra, A. M. (2015). <i>Higher Surveying</i>. New Age International Publishers. 6. Ghilani, C. D., & Wolf, P. R. (2018). <i>Elementary Surveying: An Introduction to Geomatics</i>. Pearson Education. 7. Roy, S. K. (2010). <i>Fundamentals of Surveying</i>. PHI Learning Pvt. Ltd.			

Internal Assessment (20 Marks)	Attendance and Participation: Regular attendance and active participation in theory and practical sessions. Practical Record and Field Work: Submission of practical records and completion of GPS field exercises. Assignment / Project Work: Preparation and submission of assignments or a short project on GPS surveying. Viva-Voce / Presentation: Assessment of understanding through oral examination or presentation.
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Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam. Duration	Max. Marks
5.5	V	622278	Skill Enhancement Course (SEC) III Introduction to GIS (Geographic Information System)	2	60 Hrs.	2 Hrs.	External-30 Internal-20 Total-50
Course Objectives:		1. To introduce the basic concepts and components of GIS. 2. To develop skills in spatial data collection, management, and analysis. 3. To familiarize students with GIS software and mapping techniques. 4. To understand the applications of GIS in geographical studies and planning. 5. To enhance practical skills in digital mapping and spatial analysis.					
Course Outcomes:		1. Understand the basic concepts, components, and functions of GIS. 2. Identify and manage different types of spatial and attribute data. 3. Perform basic GIS operations such as data input, editing, and analysis. 4. Create and interpret thematic maps using GIS software. 5. Apply GIS techniques to solve geographical and environmental problems. 6. Develop practical skills in digital mapping and spatial data management.					
Unit System		Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies		
Unit I		Fundamentals of GIS: - Meaning, Definition, and Evolution of GIS - Components of GIS: Hardware, Software, Data, People, and Methods - Types of Spatial and Non-Spatial Data - Coordinate Systems and Map Projections	16 Hrs.	8 Marks	1. Lecture Method – GIS concepts and principles. 2. Demonstration Method – GIS software and tools. 3. Practical Training – Data input, analysis, and mapping. 4. Project-Based Learning – GIS application projects. 5. Case Study Method – Real-world GIS examples. 6. ICT-Based Learning – Use of digital maps and geospatial data.		
Unit II		GIS Data Input and Management: - Sources of Geographic Data - Data Input Methods and Digitization	14 Hrs.	7 Marks			

	• Raster and Vector Data Models • Database Management in GIS			
Unit III	GIS Analysis and Mapping: • Basic Spatial Analysis Techniques • Query and Overlay Operations • Thematic Mapping • Map Layout and Cartographic Presentation	16 Hrs.	8 Marks	
Unit IV	Applications of GIS: • GIS in Resource Management • GIS in Urban and Regional Planning • GIS in Environmental Monitoring • GIS Applications in Agriculture, Disaster Management, and Transportation	14 Hrs.	7 Marks	
References:	1. Burrough, P. A., & McDonnell, R. A. <i>Principles of Geographical Information Systems.</i> 2. Chang, K. T. <i>Introduction to Geographic Information Systems.</i> 3. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. <i>Geographic Information Systems and Science.</i> 4. Lo, C. P., & Yeung, A. K. W. <i>Concepts and Techniques of Geographic Information Systems.</i> 5. Kang-tsung Chang. <i>GIS Fundamentals: A First Text on Geographic Information Systems.</i> 6. Heywood, I., Cornelius, S., & Carver, S. <i>An Introduction to Geographical Information Systems.</i>			

	7. • DeMers, M. N. <i>Fundamentals of Geographic Information Systems</i> .
Internal Assessment (20 Marks)	1. Attendance and Participation Regular attendance and active participation in classroom and practical sessions. 2. Practical Record Work Maintenance and submission of GIS practical records and exercises. 3. Assignment / Project Work Preparation and submission of assignments or a small GIS-based project. 4. Viva-Voce / Presentation Oral examination or presentation on GIS concepts and applications.