CBSE | DEPARTMENT OF SKILL EDUCATION CURRICULUM FOR SESSION 2025-2026 GEOSPATIAL TECHNOLOGY XII (818) JOB ROLE: GIS OPERATOR

<u>COURSE OVERVIEW:</u>

Geospatial technology is an umbrella phrase associated with a range of various technologies which include remote sensing, Global Positioning System (GPS), Geographic Information System (GIS), information technologies, and field sensors, that are intended to facilitate the process of capturing/storing/ processing/ displaying/ disseminating information tied to a location.

This present course curriculum offers an opportunity for the students to understand the basics of geospatial technology for developing an interest in the principles, practical uses, and resources related to geospatial technologies. With the exponential growth of Indian geospatial market, this initiative is intended to develop the pool of manpower trained in this subject. This course will enable the students to get an insight into the diverse geospatial database concepts, creating and implementing of the same, GIS theory and spatial analysis, supplemented by extensive practical exercises. Also, it will help the students to acquire skills for further studies and to enter the professional world.

OBJECTIVES OF THE COURSE:

In this course, the students will be introduced to the fundamental concepts of Geospatial Technology and the career opportunities available in this field. This vocational course offers professional education dealing with mapping and Geospatial production to ensure that students obtain insight into Geospatial database concepts, creating and implementing database, spatial analysis, developing GIS applications, through both theoretical concepts and supported by extensive practical exercise with hands-on training using Geomatica industry standard software.

Followings are the main objectives of this course.

- To provide knowledge to students to compile, analyze, and present geospatial data. Students will learn these basic geospatial concepts while working with Rolta's Geomatica software.
- To familiarize the students with various dimensions of Geospatial Technology and career opportunities available in these fields.
- To develop creative thinking among students and make them technology-savvy so that they could be ready to join the Geospatial industry.

SALIENT FEATURES:

- Geospatial technologies with proven capabilities for supporting decision making can effectively support governance, enable sustainable development, assist in better management of business process as well as bring location-based information closer to the people.
- > Geographic information has application in practically all walks of human existence.
- In the present economic scenario, there is an increasing demand for cost effective solutions for decision making which is likely to propel the usage of this technology and professionals across sectors in the near future.
- Geospatial technology is perhaps the only technology that can provide a holistic approach to the understanding of the interactions and inter-linkages between the earth's biophysical and social elements to strike an optimal balance between developmental and environmental goals.

LIST OF EQUIPMENT AND MATERIALS:

- > Computers
- Rolta Geomatica Software (Provided by CBSE)
- Internet connectivity
- LCD Projector (optional)
- Projector Screen (optional)

CAREER OPPORTUNITIES:

Geospatial technology is ubiquitous and the expanse of its reach in multiple fields is growing rapidly. Most technologies require a spatial component and it is one of the pillars of emerging technologies. Be it our day-to-day activities or cutting-edge futuristic research, none can be visualized without geospatial information. A vast range of career opportunities are available in this field. Following are just few of them-

- Geospatial Data Technician
- Geospatial Scientist
- Image Scientist/ Analyst
- Geospatial Developer
- Geospatial Programmer
- > Geospatial Database Engineer
- Forensic Analyst
- Criminal Intelligence Analyst

VERTICAL MOBILITY:

- > GIS Operator ------GIS Assistant or Technician ------GIS Specialist -------GIS
 - Analyst ------ Senior GIS Analyst ----- GIS Coordinator -----GIS Scientist/
 - o Manager.

OCCUPATIONS USING GEOSPATIAL TECHNOLOGY:

- o Agriculture
- o Archeology
- Banking and Financial Services
- o Business
- o Census
- Conservation
- o Criminal Justice
- Defense and Intelligence
- o Disaster Management
- o Education
- Economic Development
- Education Administration
- Education and Research
- Elections
- Emergency Response
- o Energy
- o Engineering
- Environmental Health
- Environmental Law
- Environmental Planning
- o Epidemiology
- Fire Science Forestry

GEOSPATIAL TECHNOLOGY (818) CLASS – XII

Total Marks: 100 (Theory-60 + Practical-40)

	UNITS	NO. OF HOURS for Theory and Practical 260	MAX. MARKS for Theory and Practical 100
	Employability Skills		
	Unit 1 : Communication Skills-IV	13	2
	Unit 2 : Self-Management Skills-IV	07	2
◄	Unit 3 : ICT Skills-IV	13	2
art	Unit 4 : Entrepreneurial Skills-IV	10	2
Ъ,	Unit 5 : Green Skills-IV	07	2
	Total	50	10
	Subject Specific Skills		
	Chapter 1: Remote Sensing (RS)	30	18
	Chapter 2: Geographic Information System (GIS)	30	17
t B	Chapter 3: Global Positioning System (GPS)	20	05
Par	Chapter 4: Trends in Geospatial Technology	20	05
	Chapter 5: Applications of Geospatial Technology	20	05
	Total	120	50
	Practical Work		
	Project		10
	Viva	90	05
Part C	Practical File		10
	Demonstration of skill competency via Lab Activities		15
	Total	90	40
	GRAND TOTAL	260	100

DETAILED CURRICULUM/ TOPICS:

Part-A: EMPLOYABILITY SKILLS

S. No.	Units	Duration in Hours
1.	Unit 1: Communication Skills-IV	13
2.	Unit 2: Self-management Skills-IV	07
3.	Unit 3: Information and Communication Technology Skills-IV	13
4.	Unit 4: Entrepreneurial Skills-IV	10
5.	Unit 5: Green Skills-IV	07
	TOTAL DURATION	50

NOTE: Detailed Curriculum/ Topics to be covered under Part A: Employability Skills can be downloaded from CBSE website.

Part-B – SUBJECT SPECIFIC SKILLS

S. No.	Units	Duration in Hours
1.	Chapter 1: Remote Sensing (RS)	30
2.	Chapter 2: Geographic Information System (GIS)	30
3.	Chapter 3: Global Positioning System (GPS)	20
4.	Chapter 4: Trends in Geospatial Technology	20
5.	Chapter 5: Applications of Geospatial Technology	20
	TOTAL DURATION	120

UNIT	SUB-UNIT	SESSION/ACTIVITY
1. Remote Sensing (RS)	1.1. Introduction	Introduction
		Electromagnetic Spectrum
		Stages in Remote Sensing
		Wien's Displacement law
		Various Interaction
		Responses of Sun rays
	1.2. Spectral ReflectanceSignature	Soil
		Vegetation
		Water
		Rock
		• 5. Resolution and its types
	1.3. Digital Image	Image restoration
	Processing	 Statistical analysis
		Image enhancement
		 Image classification
		 Band Rationing
		NDVI
		PVI
	1.4. Visual Interpretation of Satellite	Tone
	Data	Shape
		• Size
		Pattern
		Texture
		Shadow
		Association
	1.5. Aerial Photo and its	
	Interpretation	
	1.6. Advanced Remote	Hyper Spectral Imagery
	Sensing Technologies	Thermal Remote Sensing
		Microwave Remote Sensing
	1.7. Advantages and Benefitsof RS	
2. Geographic Information	2.1. Introduction	Spatial and Non-Spatial data
System (GIS)	2.2. GIS Data Element and Data	GIS functions
	Structure	Data Structure
	2.3. Fundamentals of	Spatial data input
	Database concepts	Attribute data input
		LINKING OF DOTH THE data set
	2.4. Data input to GISSystem	Digitization
		Data transfer
	2.5. GIS Data Editing	I opology building Topological array
		I opological errors
		Location errors Edge metables
	2.6 Attribute Data linking	
	2.0. Autobic Data III Kily	Ouory Pooloon clashro
	2.1. Spallar and Ivon-Spallar	 Query- boolean algebra Dissolve
	uala analysis	
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UNIT	SUB-UNIT	SESSION/ACTIVITY
	2.8. Map Projection and	Projections
	Coordinate System	Coordinate systems
		• UTM
		Datum
		• WGS84
	2.9. Digital Cartography	
	2.10. Advantages and Benefits	
	of GIS	
3. Global PositioningSystem	3.1. Introduction	Introduction and History
(GPS)		 Segments of GPS
		dilatation
	3.2. GPS Accuracy and	Errors
	Accuracy factors	Clock offset
	3.3. Types of GPS	DGPS
		Recreational
		Mapping
		Survey
	3.4. List of Global Navigation	Navistar
	System	Glonass
	, , , , , , , , , , , , , , , , , , ,	Galileo
	3.5. GPS today & Limitations	
	of GPS	
	3.6. Uses of GPS Technology	In Survey and Mapping
		In Height and location
		In Vehicle tracking
4. Trends in Geospatial	4.1. Introduction	
Technology	4.2. Remote Sensing Trends	Trends in Technology
	and Technology	Trends in Application
	4.3. GIS Trends and	Web based GIS
	Technology	Enterprise GIS
		Mobile GIS
		3D visualization
		Open GIS
	4.4. GPS Trends and	Stone age
	Technology	Star age
		Radio age
		Satellite age
		Latest Development
5. Applications of Geospatial	5.1. Introduction	
Technology	5.2. Watershed Studies	
	5.3. Flood Studies	
	5.4. Health Issues	
	5.5. Utility Studies	
	5.6. Security and Defense	
	Studies	
	5.7 Urban and Infrastructure	
	Studios	
	5.9 Disaster Poliof	
	5.0. Disaster Keller	
	wanagement	

UNIT	SUB-UNIT	SESSION/ACTIVITY
1. Projection of data	1.1 Dereferencing.	
	1.2 Coordinating System and	
	components.	
	1.3 Image to map	
	registration.	
	Image to imageregistration.	
2. Digitization	2.1.Building Topology	
3. Digital imageProcessing	3.1 Image enhancement.	
	3.2 Unsupervised	
	classification.	
	Supervised classification.	
4. Geospatial data creationand	4.1. Querying (Location	
editing	parameters, graphics etc.).	
	4.2. Projection data.	
	Building geo database.	
5. Spatial Analysis and	5.1. Overlay analysis	
Thematic Mapping	5.2. Reprocessing of data	
	intersection, union dissolve,	
	merge, clip.	
	5.3. Functional attribute and	
	expression.	
	Statistics and Report	
	generation.	
6. Symbiology and layouts	6.1. Map surfing.	
	layout	
	6.3 Indexing	
	6.4 Scale and annotation	
	Preparing maps for	
	presentation.	
7. On job training	7.1. Preparation of maps for.	
, 3	1. Environment analysis.	
	2. Urban area.	
	3. Water bodies.	
	Agriculture and Forest	
	Collecting ground truth with	
	GPS Overlaying of different	
	maps in GIS.	