

SENIOR SCHOOL CURRICULUM

2017-18

GEOSPATIAL TECHNOLOGY

Introduction

The term 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 particular 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 particular 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 into the world as professionals.

CLASS–XI ELECTIVE GEOSPATIAL TECHNOLOGY (740) THEORY

Time: 3 Hours

Marks: 60

Chapter–1: Geospatial Overview

5

- Introduction to Geospatial Technology.
- Why to study Geospatial Technology.
- Importance of Geospatial Technology.

Chapter–2: Mapping & Cartography

10

- What is Map & its Importance.
- Map Scale and Types.
- Elements of Map and Indexing.
- Map Coordinate System.
- Interpretation of Satellite Images.

Chapter–3: Remote Sensing

20

- Overview on Remote Sensing Technology.
- Fundamentals of Remote Sensing.
- Physics of Electro Magnetic Energy.
- Remote Sensing Platforms, Sensors and Data Products.
- Remote Sensing Applications.
- Indian Remote Sensing Systems.

Chapter-4: Geographical Information System (GIS)

20

- Fundamentals of GIS.
- Components of GIS.
- GIS Acquisition of GIS.
- Data Types of GIS.
- Application of GIS.

Chapter-5: Ground Positioning System (GPS)

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- Overview of GPS.
- Functions of GPS.
- Segments of GPS.
- Accuracy of GPS.
- Applications of GPS.

PRACTICAL

Time: 2 Hours

Marks: 40

Exercise No. 1:

5

- To map School building and surrounding environment.

Exercise No. 2:

5

- To display the various types of the matic geological, political. Meteorological and cadastral maps subject to availability.
- To read the maps and identify Map features.
- To learn usage of Maps.

Exercise No. 3:

10

- To display two different scales of Toposheets of same area.
- To read Toposheet index and identify the adjacent Toposheets.
- To understand the small and large scale concepts.
- To compare the same area coverage by two different scaled Toposheets.
- To identify the different types of point's line and polygon features.

- To identify the map elements.
- To know the four coordinates of Topo sheets.
- To learn findout the location of any point.

Exercise No. 4:

10

- To display the satellite imagery and Toposheet of same area.
- To identify the same features from Topo sheet and Satellite image.
- Compare the identified features with toposheets and satellite image.

Exercise No. 5:

5

- To understand the GIS environment for example open file, Display images and operate various functions such as zoon in, Zoom out, open attribute table and reading them overlay etc.

Exercise No. 6:

5

- To Understand the GPS data collection and map them.
- Prepare table of coordinates and elevation of all points collected.
- Compare the results on Google map.

CLASS–XI
GENERAL FOUNDATION COURSE (501)
(Common for Engineering & Technology Based Courses)

CLASS–XII
ELECTIVE
GEOSPATIAL TECHNOLOGY (740)
THEORY

Time: 3 Hours

Marks: 60

Chapter–1: Remote Sensing (RS)

20

- Introduction.
- Spectral Reflectance Signature.
- Digital Image Processing.
- Visual Interpretation of Satellite data.
- Aerial Photo and Its Interpretation.
- Advanced Remote Sensing Technologies.
- Advantages and Benefits of RS.

Chapter–2: Geographic Information System (GIS)

20

- Introduction.
- GIS Data Element and Data Structure.
- Fundamentals of Database Concept.

- Data Input to GIS System.
- GIS Data Editing.
- Attribute Data Linking.
- Spatial and Non Spatial data Analysis.
- Map Projection and Coordinate System.
- Digital Cartography.
- Advantages and Benefits of GIS.

Chapter–3: Global Positioning System (GPS)

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- Introduction.
- GPS Accuracy and Accuracy factors.
- Types of GPS.
- List of Global Navigation System.
- GPS Today & Limitations of GPS.
- Uses of GPS Technology.

Chapter–4: Trends in Geospatial Technology

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- Introduction.
- Remote Sensing Trends & Technology.
- GIS Trends & Technology.
 - (i) Web Based GIS.
 - (ii) Enterprise GIS.
 - (iii) Mobile GIS.
 - (iv) 3-D Visualization and Fly through.
 - (v) Open GIS.
- GPS Trends & Technology.

Chapter–5: Applications of Geospatial Technology

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- Water shed Studies.
- Flood Studies.
- Ground water Studies.
- Health Issues.
- Utility Studies.
- Security and Defense Studies.
- Urban and infrastructure Studies.

PRACTICAL

Time: 2 Hours

Marks: 40

1. Projection of Data	5
<ul style="list-style-type: none">• Georeferencing.• Coordinating System and components.• Image to map registration.• Image to image registration.	
2. Digitization	5
<ul style="list-style-type: none">• Building Topology.	
3. Digital Image Processing	5
<ul style="list-style-type: none">• Image enhancement.• Unsupervised classification.• Supervised classification.	
4. Geospatial Data Creation and Editing	5
<ul style="list-style-type: none">• Querying (Location parameters, graphics etc.).• Projection data.• Building geo database.	
5. Spatial Analysis & Thematic Mapping	5
<ul style="list-style-type: none">• Overlay analysis• Geoprocessing of data intersection, union dissolve, merge, clip.• Functional attribute and expression.• Statistics and Report generation.	
6. Symbology & Layouts	5
<ul style="list-style-type: none">• Map surfing.• Preparing map and its layout.• Indexing.• Scale and annotation.• Preparing maps for presentation.	
7. On Job Training	10
<ul style="list-style-type: none">• Preparation of maps for.• Environment analysis.• Urban area.• Water bodies.• Agriculture and Forest Collecting ground truth with GPS Overlaying of different maps in GIS.	

CLASS–XII
GENERAL FOUNDATION COURSE (501)
(Common for Engineering & Technology Based Courses)

LIST OF RECOMMENDED BOOKS

1. Geospatial Technology, Practical Manual XII, published by CBSE.
2. Geospatial Technology, Teachers Manual XI, published by CBSE.
3. Geospatial Technology, Teachers Manual XII, published by CBSE.
4. Geospatial Technology, Text Book XI, published by CBSE.
5. Geospatial Technology, Text Book XII, published by CBSE.

SUGGESTED LIST OF EQUIPMENTS AND TOOLS

S. No.	Name of article	Quantity
1.	Currycombs.	10 nos.
2.	Stiff brushes.	10 nos.
3.	Computer lab with internet connection.	
4.	Computers with installed Geometrical Software.	6 nos.

