

ADD ON Course

Organised by

Department of Geography and Department of Computer Science

Session 2021-2022

Course Title : REMOTE SENSING & GIS

Objectives of the course :

- Everyone should understand about the basic principles, applications of geographical information system (GIS).
- Everyone should understand remote sensing (RS), cartography and global positioning system(GPS).
- Everyone should understand data and information acquisition, extraction, management and analysis and also the students should know about the spatial and statistical modelling, mapping and visualization.
- Everyone should understand how geographical information is used and managed.
- Everyone should understand how to apply vector and raster spatial data, particularly with regard to local/state/national issues, emphasizing on the pattern of the landuse and landcover of the particular region.
- Everyone should understand to increase an awareness of GIS and its associated modelling tools.
- Everyone should understand how to develop applications of environmental remote sensing and GIS which can directly enhance service delivery on land use management, ground water management/prospects, agriculture, food and water security, disaster management, etc.
- Everyone should understand how to use the databases.
- Everyone should understand concepts and applications leading to modelling of earth resources management using Remote Sensing

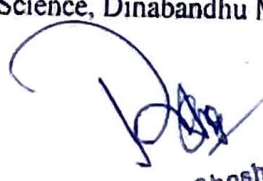
Course Coordinator

- **Bidisha Barua**

Assistant Professor, Department of Geography, Dinabandhu Mahavidyalaya, Bongaon

- **Susobhan Ghosh**

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General Information

Duration : 40 hours

Entry Qualification : Honours and General Students of Geography and Pure Science

Language : Bengali / English

Venue : Dinabandhu Mahavidyalaya, Bongaon

SYLLABUS OF REMOTE SENSING & GIS

➤ Information System

Software: Classification System, application, enterprise, free ware, open source

Database : Data, File vs Database, DBMS, Data abstraction, spatial databases, Instance, Schema, Data Model, Database Languages, DDL, DML, entity, attributes, Keys, SQL, table creation, data insertion, updation, Queries for different database operations.

Communication systems : wired and wireless communication, LAN, WAN, MAN, Topologies, Internet, WWW, web browser, web server, client, TCP/IP Protocol Suite, IP Address

Introduction to Windows operating system

MS-Word : Page setup, Font size, Font style, Font color, Header and Footer, footnote, inserting picture, wrapping textbox, hyperlink, table, equation editor.

MS-Excel : Page setup, inserting row and column, worksheet, chart, function, text to column, formatting cell, color, calculation using function, statistical analysis and presentation.

MS-Access : Database designing, Sort and filter records, SQL queries, relationships between tables and joins, import and export table data.

➤ Concept of Remote Sensing:

Introduction of Remote Sensing, Definition, Remote Sensing Art or Science, Remote Sensing Process, Source of Energy, Interaction with Atmosphere, Application of Remote Sensing, Advantages of Remote sensing, Limitation of Remote Sensing, Ideal Remote Sensing System

➤ Types of Remote Sensing and Sensor Characteristics

(Classification Based on Platform, Classification Based on Energy Source, Classification Based on Imaging Media, Classification Based on Electronic Magnetic Spectrum, Classification Based on Number of Bands, Remote Sensing Satellites,

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Concept of Swath, Concept of Nadir, Sensor Resolutions: Spatial, Spectral, Radiometric, Temporal, Image Referencing System: Path, Row and Orbital Calendar.

➤ **Photographic Imaging**

Types of Camera (Metric Cameras, Multiple Lens Cameras, Panoramic Cameras, Strip Cameras) Films (Types of Film, Film Size, Film Resolution, Processing of Black-White Film)

Geometry of Aerial Photography (Scale of Photography, Vantage Point, Ideal time and atmosphere for Aerial remote Sensing)

➤ **Visual Image Interpretation:**

Information Extraction by Human and Computer, Remote Sensing Data Products, Border or Marginal Information, Image Interpretation, Elements of Visual Image Interpretation, Interpretation Keys

➤ **Digital Image Processing:**

Categorization of Image Processing, Image Processing Systems, Data Formats of Digital Image, Display of Digital Image, Pre-Processing (Radiometric Correction and Geometric Correction of Remotely Sensed Data), Image Enhancement, Image Transformation, Image Classification

➤ **Application of Remote Sensing:**

Land-Cover and Land-Use

➤ **Concept of Geographic Information System:**

Definition of GIS, Key Components of GIS, GIS-An Integrate of Spatial and Attribute Information, GIS-Three Views of Information System, GIS-A knowledge Hub

➤ **Functions and Advantages of GIS:**

Functions of GIS, Application Areas of GIS, Advantages of GIS, Disadvantages of GIS

➤ **Spatial Data Model:**

Spatial Data Model, Raster Data Model, Vector Data Model, Advantages and Disadvantages of Raster and Vector

➤ **Process of GIS:**

Data Capture, Data Sources, Data Encoding Methods (Raster and Vector Data)


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➤ **Geospatial Analysis:**


Geospatial data analysis and its methods, Geovisualization (Georeferencing of maps and images, digitisation of features, data attachment, Pie Chart, Choropleth, Bar Graph, Thematic Maps)

➤ **Future of GIS:**

Planning of Project, Implementation of Project, Management of Project, Keys for successful GIS, Keys for Unsuccessful GIS

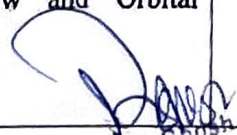
➤ **Applications:**

Collecting and Plotting of GPS waypoints : Collecting by Smart Phone and Plotting on QGIS.


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Course Schedule

Name of the Faculty	Topic	Time
Susobhan Ghosh	<i>Software:</i> Classification System, application, enterprise, free ware, open source <i>Database :</i> Data, File vs Database, DBMS, Data abstraction, spatial databases, Instance, Schema, Data Model, Database Languages, DDL, DML, entity, attributes, Keys, SQL, table creation, data insertion, updation, Queries for different database operations.	2 hour
Susobhan Ghosh	<i>Communication systems :</i> wired and wireless communication, LAN, WAN, MAN, Topologies, Internet, WWW, web browser , web server, client, TCP/IP Protocol Suite, IP Address Introduction to Windows operating system	2 hour
Susobhan Ghosh	<i>MS-Word :</i> Page setup, Font size, Font style, Font color, Header and Footer, footnote, inserting picture, wrapping textbox, hyperlink, table, equation editor. <i>MS-Excel :</i> Page setup, inserting row and column, worksheet, chart, function, text to column, formatting cell, color, calculation using function, statistical analysis and presentation.	4 hour
Susobhan Ghosh	<i>MS-Access :</i> Database designing, Sort and filter records, SQL queries, relationships between tables and joins, import and export table data.	4 hour
Bidisha Barua	Concept of Remote Sensing: Introduction of Remote Sensing(Definition, Remote Sensing Art or Science, Remote Sensing Process, Source of Energy, Interaction with Atmosphere, Application of Remote Sensing, Advantages of Remote sensing, Limitation of Remote Sensing, Ideal Remote Sensing System)	2 hour
Bidisha Barua	Types of Remote Sensing and Sensor Characteristics : Classification Based on Platform, Classification Based on Energy Source, Classification Based on Imaging Media, Classification Based on Electronic Magnetic Spectrum, Classification Based on Number of Bands, Remote Sensing Satellites, Concept of Swath, Concept of Nadir, Sensor Resolutions: Spatial, Spectral, Radiometric, Temporal, Image Referencing System: Path, Row and Orbital Calendar.	4 hour


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Name of the Faculty	Topic	Time
Bidisha Barua	Photographic Imaging : Types of Camera (Metric Cameras, Multiple Lens Cameras, Panoramic Cameras, Strip Cameras) Films (Types of Film, Film Size, Film Resolution, Processing of Black-White Film) <u>Geometry of Aerial Photography</u> (Scale of Photography, Vantage Point, Ideal time and atmosphere for Aerial remote Sensing)	2 hour
Bidisha Barua	Visual Image Interpretation :Information Extraction by Human and Computer, Remote Sensing Data Products, Border or Marginal Information, Image Interpretation, Elements of Visual Image Interpretation, Interpretation Keys Digital Image Processing :Categorization of Image Processing, Image Processing Systems, Data Formats of Digital Image, Display of Digital Image, Pre-Processing (Radiometric Correction and Geometric Correction of Remotely Sensed Data), Image Enhancement, Image Transformation, Image Classification Application of Remote Sensing :Land-Cover and Land-Use	4 hour
Bidisha Barua	Concept of Geographic Information System :Definition of GIS, Key Components of GIS, GIS-An Integrate of Spatial and Attribute Information, GIS-Three Views of Information System, GIS-A knowledge Hub Functions and Advantages of GIS :Functions of GIS, Application Areas of GIS, Advantages of GIS, Disadvantages of GIS Spatial Data Model :Spatial Data Model, Raster Data Model, Vector Data Model, Advantages and Disadvantages of Raster and Vector Process of GIS :Data Capture, Data Sources, Data Encoding Methods (Raster and Vector Data)	4 hour


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Name of the Faculty	Topic	Time
Dr. Raja Majumder	Geospatial Analysis: Geospatial data analysis and its methods, Geovisualization (Georeferencing of maps and images, digitisation of features, data attachment, Pie Chart, Choropleth, Bar Graph, Thematic Maps)	4 hour
Dr. Raja Majumder	Future of GIS: Planning of Project, Implementation of Project, Management of Project, Keys for successful GIS, Keys for Unsuccessful GIS	4 hour
Dr. Raja Majumder	Applications: Collecting and Plotting of GPS waypoints : Collecting by Smart Phone and Plotting on QGIS	4 hour


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