

# Online add-on course on Remote Sensing & GIS with Application of Advanced Statistical Software

Organized by

Department of Geography,  
Hiralal Bhakat College,  
Nalhati, Birbhum  
in collaboration with

Friends of Environment

## Course Description

This course is designed to provide students with an in-depth understanding of Geographic Information Systems (GIS) and their application in spatial analysis and statistical modeling. This course builds upon the fundamental concepts of GIS and focuses on advanced techniques and methodologies used in spatial data analysis. Moreover, the course begins with a review of basic GIS principles, including data acquisition, data management, and spatial data visualization. Students will gain hands-on experience with industry-standard GIS software and learn how to efficiently manipulate and analyze spatial data.



DATE: 28 MAY TO  
22TH JULY, 2023



## Course Objective

- 1. Comprehensive Understanding:** Provide students with a comprehensive understanding of Geographic Information Systems (GIS) and their application in spatial analysis and statistical modeling.
- 2. Advanced Techniques:** Introduce students to advanced GIS techniques and methodologies used in spatial data analysis, enabling them to handle complex spatial datasets effectively.
- 3. Spatial Statistics Knowledge:** Familiarize students with the principles and techniques of spatial statistics, allowing them to analyze patterns, relationships, and trends in geographic data.
- 4. Hands-on Experience:** Provide hands-on experience with industry-standard GIS software, allowing students to gain practical skills in data manipulation, visualization, and analysis.
- 5. Real-world Applications:** Provide students with practical experience through hands-on exercises and real-world case studies, enabling them to apply spatial statistics in diverse domains such as environment, social sciences, and economics.

No. of Hours / Week 4 hours

Total Teaching Hours: 38 hours

A. Class: 32 hours

B. Assignment: 6 hours

Marks: 60 (Converted to 100)

Online Platform: Zoom

# Learning Outcome

Upon successful completion of the course, students will be able to:

1. Demonstrate a comprehensive understanding of Geographic Information Systems (GIS) principles, including data acquisition, management, and spatial data visualization.

1. Apply advanced GIS techniques and methodologies to efficiently manipulate, analyze, and visualize complex spatial datasets.

1. Utilize spatial statistics techniques to analyze patterns, relationships, and trends in geographic data.

1. Demonstrate proficiency in using industry-standard GIS software for data manipulation, visualization, and spatial analysis.

**Medium of Interaction:** English.  
**Eligibility:** Any Student or Researcher from Geography, history, environment, Botany, Zoology, Geology, and other allied subject of science.

### Technical Requirements:

Laptop with stable internet connection, headphones.

## Professional Scope & Concluding Notes

The professional scope of the course extends to both public and private sectors, including government agencies, environmental organizations, consulting firms, research institutions, and technology companies. Graduates with skills in GIS and spatial statistics are in demand due to the growing reliance on spatial data analysis for evidence-based decision-making across diverse fields.

### Certificates

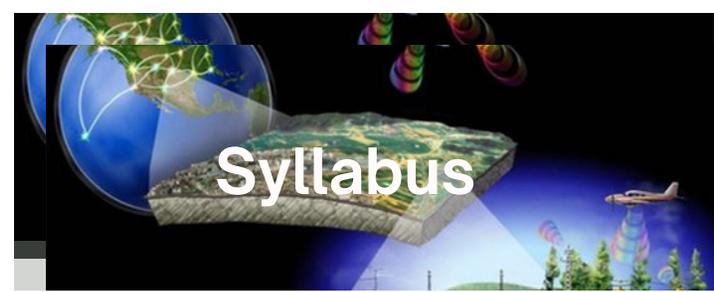
60% attendance and 35% marks in the assignment are mandatory to get the certificate.

### Evaluation Criteria:

Grand Total of Marks of each CIA will be calculated for each participant, and the same will be converted to percentage scale (as below).

### Grades for certification:

- 85% - 100% marks: Understanding is 'Excellent'
- 70% - 85% marks: Understanding is 'Very Good'
- 60% - 70% marks: Understanding is 'Good'
- 50% - 60% marks: Understanding is 'Average'
- 30% - 50% marks: 'Needs improvement'.



Unit 1: 2 Hours

Introduction to Basic concept of GIS (Theory):

1. What is GIS
2. Component of GIS ,
3. Data in GIS
4. Concept of Georeferencing and its component

Unit 2 6 Hour

Basic of mapping:

Georeferencing of toposheet map,  
georeferencing from vector data  
Preparation of shapefile (Line, point, and Polygon) and digitization  
Data attachment and thematic mapping  
Layout preparation

Unit 3 2 Hours

Introduction to Remote Sensing and satellite images (Theory)

Basic concept of Remote Sensing  
Concept and types of satellite images

Concept and types of resolution  
Concept of Digital elevation model

Unit 4

Satellite image processing (Practical) 10 Hours

Satellite image download (Landsat and Sentinel)

Pre-processing of satellite image

Image masking and composite bands

Processing and post-processing of satellite images (Kappa statistics)

Extraction of Rivers from Digital elevation model.

Preparation of relative relief, absolute relief, and dissection index

## Unit 5

Introduction to Multivariate Statistics  
(Theory) 4 Hours

Concept of multivariate statistic

Concept of Principal component  
analysis

Concept of multi-linear regression

## Unit 6

Application of multivariate statistics  
along with GIS (Practical) 8 Hours

Collection and preparation of data  
from map for PCA3

Analysis of PCA

Attachment of result in GIS

Mapping of PCA

Fees structure:

Students: 1200/- INR

Research scholar: 1500/- INR

Faculty: 2000/- INR

## Continuous Internal Assessment (CIA) – 1

**Concept on GIS and thematic mapping**  
2 Hours

1. 10 Multiple choice questions of 10 marks
2. Preparation of project of 10 marks

**Continuous Internal Assessment (CIA) – 2**

Concept of satellite images and satellite  
image processing 2 Hours

10 Multiple choice questions of 10 marks  
Preparation of project of 10 marks

**Continuous Internal Assessment  
(CIA) – 3**  
2 Hours

Concept of multivariate statistics  
and its coordination with GIS

10 Multiple choice questions of 10  
marks

Preparation of project of 10 marks

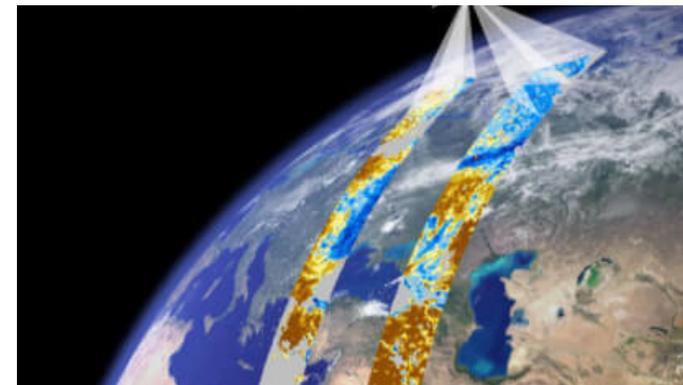
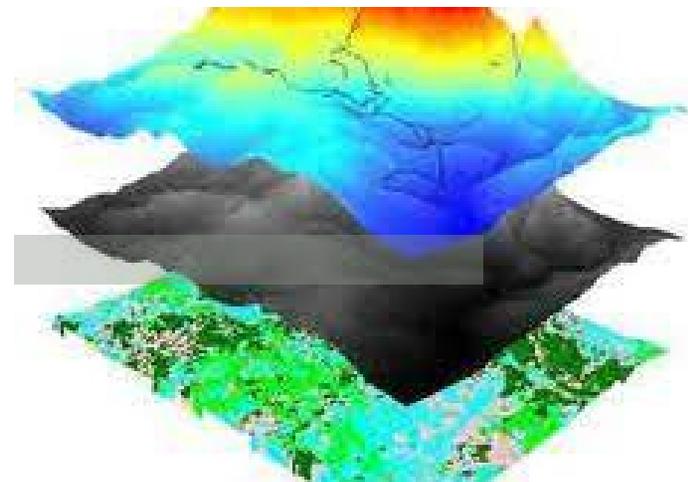
### Important Dates

Registration start: 01/05/23

Registration closed: 20/05/23

Last date of payments:  
25/05/23

Confirmation of participation:  
26/05/23



**REGISTRATION LINK:**

[https://forms.gle/iQmHjRmo  
W7WxwLc99](https://forms.gle/iQmHjRmoW7WxwLc99)

For Updates plz join Whatsapp Group  
<https://chat.whatsapp.com/IPbkYGKPYjpJFxa2qPw>

Visit us

[athttps://www.hbcnht.in/departme  
nt\\_overview.php?dept=5&item\\_id=1](https://www.hbcnht.in/departme<br/>nt_overview.php?dept=5&item_id=1)