Title: "Online add-on course on Remote Sensing & GIS with Application of Advanced Statistical Software"

Date: 28th. May to 22th. July, 2023

Course Title	No. of Hours / Week	Total Teaching Hours	Marks	Credits	Online Platform	Level of Knowledge
Online add-on course on Remote Sensing & GIS with Application of Advanced Statistical Software	4 Hours	38 hours (Classes: 32 hours, Assignments: 6 hours)	60 (Converted to 100)	4	Zoom	Basic to Advance Mapping (Multidisciplinary Approach)

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.

Objective:

The major objectives of the course are:

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.

6. **Spatial Interpolation:** Equip students with the ability to estimate values at unobserved locations using interpolation techniques such as kriging, inverse distance weighting, and spline interpolation.

By achieving these objectives, students will develop a strong foundation in GIS and spatial statistics, equipping them with the skills necessary to tackle complex spatial analysis problems and contribute to various professional fields where spatial data analysis and decision-making are critical.

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.

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

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

4. 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 subjects of science.

Technical Requirements:
Laptop with stable internet connection, headphones.

Syllabus

Unit 1: 2 Hours

Introduction to Basic Concept of GIS (Theory)

- **A)** What is GIS
- **B)** Component of GIS ,
- **C)** Data in GIS
- **D)** Concept of Georeferencing and its Component

Unit 2: 6 Hours

Basic of Mapping (Practical)

- **A)** Georeferencing of toposheet, georeferencing from vector data
- **B)** Preparation of shapefile (Line, point, and Polygon) and digitization
- **C)** Data attachment and thematic mapping
- **D)** Layout preparation

Unit 3: 2 Hours

Introduction to Remote Sensing and Satellite Images (Theory)

- **A)** Basic concept of Remote Sensing
- **B)** Concept and types of satellite images
- **C)** Concept and types of resolution
- **D)** Concept of Digital Elevation Model

Unit 4: 10 Hours

Satellite Image Processing (Practical)

- **A)** Satellite image download (Landsat and Sentinel)
- **B)** Pre-processing of satellite image
- **C)** Image masking and composite bands
- **D)** Processing and post-processing of satellite images (Kappa statistics)
- **E)** Extraction of Rivers from Digital Elevation Model
- **F)** Preparation of relative relief, absolute relief, and dissection index

Unit 5: 4 Hours

Introduction to Multivariate Statistics (Theory)

- A) Concept of multivariate statistic
- B) Concept of Principal Component Analysis
- C) Concept of multi-linear regression

Unit 6: 8 Hours

Application of Multivariate Statistics along with GIS (Practical)

- A) Collection and preparation of data from map for PCA3
- B) Analysis of PCA

C) Attachment of result in GIS
D) Mapping of PCA

Continuous Internal Assessment (CIA)-1

Concept on GIS and Thematic Mapping: 2 Hours

A) 10 Multiple choice questions of 10 marks
B) Preparation of project of 10 marks

Continuous Internal Assessment (CIA)-2

Concept of satellite images and satellite image processing: 2 Hours

A) 10 Multiple choice questions of 10 marks
B) Preparation of project of 10 marks

Continuous Internal Assessment (CIA)-3

Concept of Multivariate Statistics and its Coordination with GIS: 2 Hours

A) 10 Multiple choice questions of 10 marks
B) Preparation of project of 10 marks

Unit 6:1 Hour

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'**

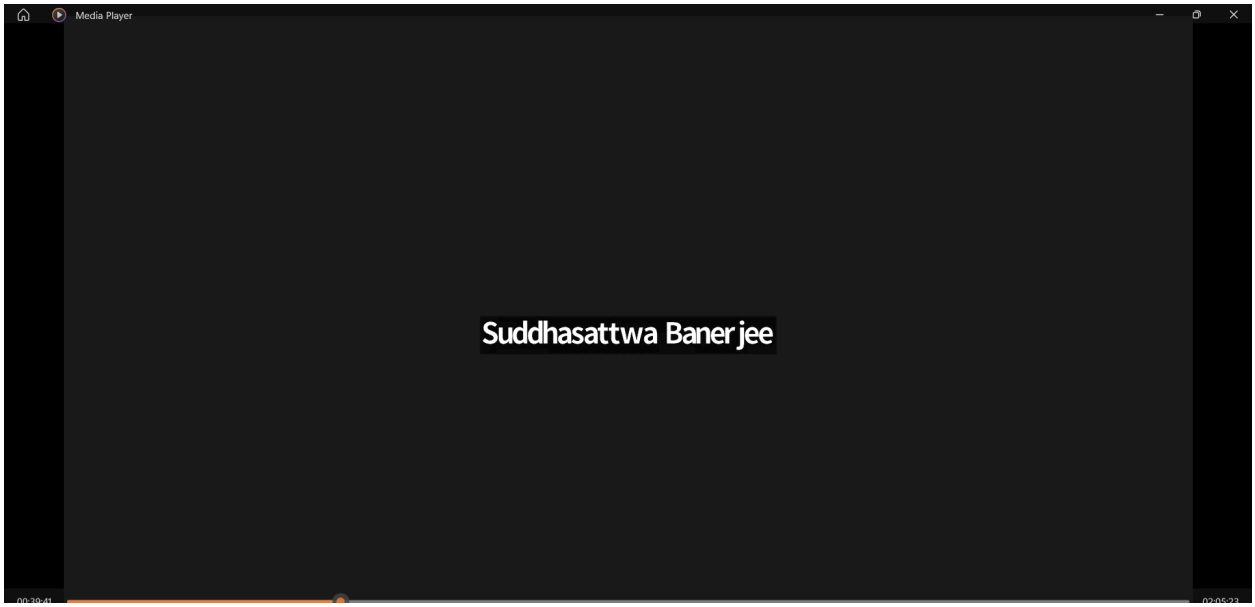
60% - 70% marks: Understanding is **'Good'**

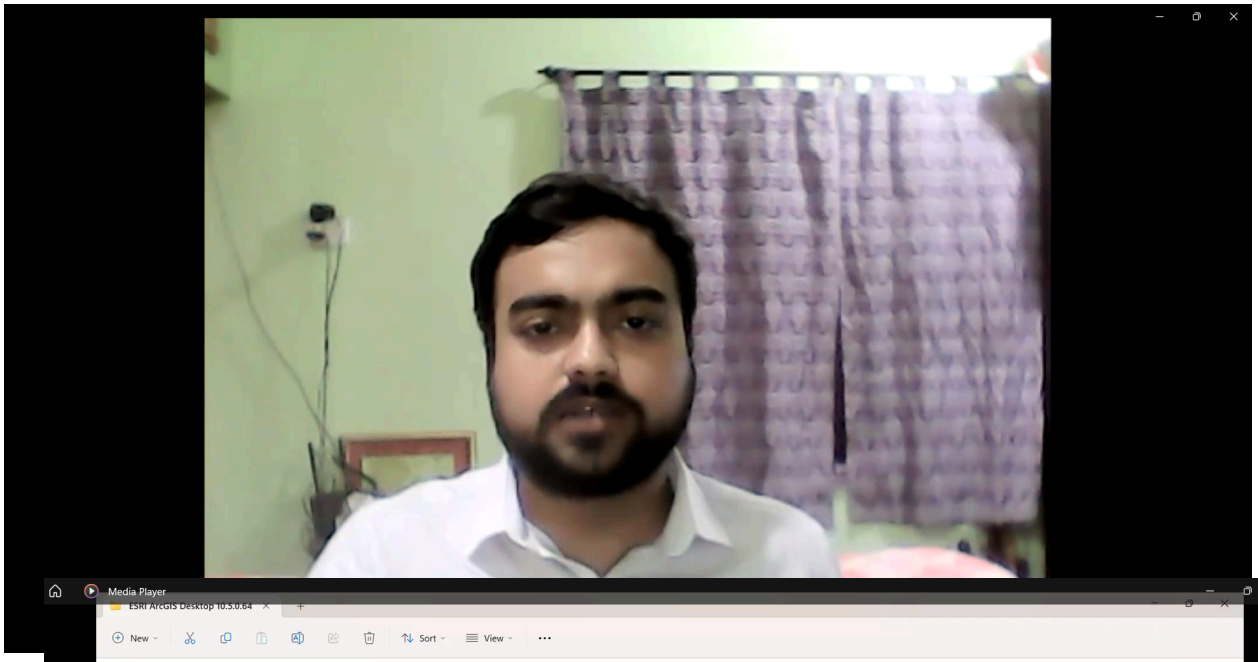
50% - 60% marks: Understanding is **'Average'**

30% - 50% marks: 'Needs improvement'.

No. of participants register: 49

Registered students' link:
https://docs.google.com/spreadsheets/d/1sCqBWnN7Eh997JW3N94fQkeXOog6kHpe/edit?usp=sharing&ouid=108767210678876568076&rtpof=true&sd=true



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CERED
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CERTIFICATE
OF APPRECIATION
The following awards are given to
URBI SARKER
has participated in a ONLINE HAND ON TRAINING PROGRAMME ON REMOTE SENSING AND GIS WITH APPLICATION OF ADVANCE STATISTICAL SOFTWARE (RSGASS), jointly conducted by Department of Geography Hiralal Bhakat college, Nalhati, Birbhum and Centre for Environmental Research Education and Development (CERED) of Hariharpur Friends of Environment (HFOE). From 28.05.2023 to 23.07.2023
Apurba Koley
DIRECTOR
CENTRE FOR ENVIRONMENTAL RESEARCH, EDUCATION AND DEVELOPMENT
PRINCIPAL
HIRALAL BHAKAT COLLEGE
Snehasish Pal
COURSE COORDINATOR
RSGASS