Polba Mahavidyalaya
Polba, Hooghly
Pin-712148
(Affiliated to the University of Burdwan)

Add on Course

SUBJECT

Application of GIS & Remote Sensing in Disaster Study

Organized by

Department of Geography &
IQAC

Duration: 30 Hours
23rd May, 2023 to 5th June, 2023

Chief Patron

Mr. Narugopal Kaibarta
Teacher-in-Charge

Eligibility

6th Semester Student of Geography (ongoing)

No Course fees are needed for this course; the course is free for interested students

Certificates will be issued only to those participants who complete the Course successfully by following rules & and regulations.

Rules & Regulations related to the Course:

- The assessment process will have a total score of 100. Out of these 10 marks forattendance.
- The process of evaluation will be explained during the class sessions.
- Students must attend all the assessments that have been scheduled to be eligible forcertification.
- Every student must have a minimum attendance of 70% throughout the course toreceive any certificate.
- The certificate's category will be decided based on the marks obtained, following thesubsequent guidelines:

Score on 100	Grade
90-100	A+
80-89	A
70-79	B+
60-69	B
50-59	C
Below 50	Fail

Course Design

Course	Basics of Computer Application
Eligibility	6th Sem students of Under Graduate level of Geography
Faculty	Internal faculty
Course Fee	Nil
Intake Capacity	20
Class Duration	1 Class-1 hr.3hrs / day.
Course Duration	30 hours
Assessment Process	i. Attendance ii. Assignment
Student Feedback	

Course Objectives

This 30-hour "Application of GIS & Remote Sensing in Disaster Study" course will provide:

Understanding Disaster Dynamics: Gain insight into the dynamics of disasters, including their causes, impacts, and patterns, through the lens of Geographic Information Systems (GIS) and Remote Sensing (RS) technologies.

Introduction to GIS and RS Tools: Familiarize students with the basic principles, functionalities, and applications of GIS and RS tools in disaster management and mitigation.

Data Acquisition and Processing: Develop skills in acquiring, processing, and analyzing spatial data from various sources, including satellite imagery, aerial photographs, and GIS databases, to assess disaster risk and vulnerability.

Spatial Analysis Techniques: Learn advanced spatial analysis techniques, such as spatial interpolation, suitability modeling, and hotspot analysis, to identify high-risk areas and assess the potential impact of disasters.

Disaster Risk Assessment: Explore methodologies for conducting comprehensive disaster risk assessments using GIS and RS techniques, integrating factors such as land use, population density, infrastructure, and environmental hazards.

Early Warning Systems: Understand the role of GIS and RS in developing early warning systems for natural disasters, including floods, wildfires, earthquakes, and hurricanes, to facilitate timely response and mitigation efforts.

Disaster Mapping and Visualization: Learn how to create informative and visually compelling maps and visualizations using GIS and RS tools to communicate spatial patterns, trends, and vulnerabilities related to disasters.

Integration with Other Disciplines: Explore interdisciplinary approaches by integrating GIS and RS with fields such as meteorology, geology, sociology, and urban planning to enhance disaster preparedness, response, and recovery strategies.

Case Studies and Practical Applications: Analyze real-world case studies and engage in hands-on exercises to apply GIS and RS techniques to various disaster scenarios, fostering critical thinking and problem-solving skills.

Course Description

This course offers an in-depth exploration into the application of Geographic Information Systems (GIS) and Remote Sensing (RS) technologies in the study, management, and mitigation of disasters. Through a combination of theoretical lectures, practical exercises, and case studies, students will gain the knowledge and skills necessary to utilize spatial analysis tools and geospatial data to understand the dynamics of disasters, assess risks, and develop effective disaster management strategies.

Couse Structure

S.No.	Chapter	Theory Hours	Practical Hours	Teaching Activities
1.	Introduction to GIS and Remote Sensing	2	2	Impairing knowledge of GIS & Remote Sensing
2.	Spatial Analysis Techniques	2	2	Impairing knowledge of the Spatial Analysis
3.	Data Processing and Disaster Mapping	2	4	Impairing knowledge of Data Processing and application of GIS and Remote Sensing in Disaster Management
4.	Early Warning Systems and Case Studies	2	2	Impairing Knowledge of application of GIS and Remote Sensing in early warning system

5.	Integration and Practical Applications	2	4	Practical application of GIS and Remote Sensing in different types of disaster management with some practical examples
6.	Project Presentations and Review	1	4	Checking the students' project and review the whole course
	Total Hours	**11**	**18**	**-**
7	Assessment	**1**		**-**

Outline of the Syllabus

1. Introduction to GIS and Remote Sensing

Overview of GIS and RS technologies, principles, and applications in disaster studies.
Introduction to geospatial data types, sources, and acquisition methods.
Hands-on introduction to GIS software (e.g., ArcGIS, QGIS) and basic operations.

2. Spatial Analysis Techniques

Spatial analysis concepts and techniques for disaster risk assessment.
Advanced spatial analysis methods, including proximity analysis, terrain modeling, and interpolation.
Practical exercises on spatial analysis using GIS software.

3. Data Processing and Disaster Mapping

Data preprocessing techniques for satellite imagery and aerial photographs.
Disaster mapping principles and visualization techniques.
Creating disaster maps and visualizations using GIS software.

4. Early Warning Systems and Case Studies

Design and implementation of early warning systems for various types of disasters.
Case studies of GIS and RS applications in disaster management and response.
Analyzing case studies and conducting hands-on exercises.

5. Integration and Practical Applications

Interdisciplinary approaches to disaster study, integrating GIS and RS with other disciplines.
Ethical and legal considerations in using GIS and RS data for disaster research.
Final project workshop (students work on applying GIS and RS techniques to analyze a specific disaster scenario).

6. **Project Presentations and Review**

Project Presentations.
Course Review and Discussion.

Learning Resources

Andrew C. Millington, Mark D. Schulz, and Steven J. (2001). Arrowsmith. GIS and Remote Sensing Applications in Biogeography and Ecology. Spriger NY.

Qihao W. (2010). Remote Sensing and GIS Integration: Theories, Methods, and Applications. McGraw Hill.

Instructor:

1. Dr. Rituparna Hajra
   (Registration No. 243-GID-B3-2006)
   Department of Geography
2. Mr. Ayan Banerjee
   Department of Geography

Course Outcome

The outcomes of the course are:

Understanding of Disaster Dynamics: Students will demonstrate an understanding of the dynamics of disasters, including their causes, impacts, and patterns, and the role of GIS and remote sensing technologies in studying and analyzing these phenomena.

Proficiency in GIS and Remote Sensing Tools: Students will gain proficiency in using GIS and remote sensing software and tools to acquire, process, analyze, and visualize geospatial data relevant to disaster studies.

Spatial Analysis Skills: Students will develop skills in conducting spatial analysis, including proximity analysis, terrain modeling, and hotspot identification, to assess disaster risks and vulnerabilities.

Disaster Mapping and Visualization: Students will be able to create informative and visually compelling maps, graphs, and spatial visualizations using GIS and remote sensing techniques to communicate spatial patterns, trends, and vulnerabilities related to disasters.

Early Warning System Design: Students will understand the design and implementation of early warning systems for various types of disasters, leveraging GIS and remote sensing technologies to monitor, analyze, and forecast hazardous events for timely response and mitigation.

Disaster Risk Assessment: Students will be capable of conducting comprehensive disaster risk assessments using GIS and remote sensing techniques, integrating factors such as land use, population density, infrastructure, and environmental hazards to inform disaster management strategies.

Case Study Analysis: Students will analyze real-world case studies and apply GIS and remote sensing techniques to evaluate and assess disaster scenarios, developing critical thinking and problem-solving skills in the context of disaster management.

Interdisciplinary Integration: Students will explore interdisciplinary approaches by integrating GIS and remote sensing with other disciplines such as meteorology, geology, sociology, and urban planning to enhance disaster preparedness, response, and recovery strategies.

Ethical and Legal Considerations: Students will understand the ethical and legal implications of using GIS and remote sensing data in disaster studies, including data privacy, intellectual property rights, and the responsible dissemination of sensitive information.

Project Management and Communication: Students will demonstrate the ability to manage and communicate geospatial analysis results effectively, including project planning, data interpretation, and presentation to stakeholders in disaster management and response agencies.