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)

POLBA MAHAVIDYALAYA
Estd-2005
Dist.- Hooghly

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

POLBA MAHAVIDYALAYA Estd- 2005 Dist.: Hooghly

Course Design

Course	Application of GIS & Remote Sensing in Disaster Study
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 iii.Assessment
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.

To
The Teacher-in-Charge
Polba Mahavidyalaya
Polba, Hooghly
Pin- 712148

Sub: Seeking permission to organize an Add on course on Application of GIS & Remote Sensing in Disaster Study

Sir,
With due respect, I, on behalf of Department of Geography, would like to request your kind permission to organize an thirty-hour Add on course entitled "Application of GIS & Remote Sensing in Disaster Study" during the period of 23rd May to 5th June, 2023 in the college premises.

Hope you would be kind enough to provide your administrative permission for the forthcoming Add on Course.

Thanks and Regards,

Rituparna Hajra

Dr. Rituparna Hajra 28/04/2023
Assistant Professor,
Polba Mahavidyalaya

Allowed.
29/04/23.

Teacher in Charge
Polba Mahavidyalaya
Polba, Hooghly, West Bengal

POLBA MAHAVIDYALAYA
Estd-2005
Dist.- Hooghly

Telephone: (03213) 225128, 225133
Fax : (03213) 225128
web site: polbamahavidyalaya.com
e-mail: officepolbamahavidyalaya@gmail.com

POLBA MAHAVIDYALAYA

Post Office - Polba, District – Hooghly, West Bengal, Pin - 712148

AFFILIATED TO THE UNIVERSITY OF BURDWAN
Recognized under Sections 2(f) & 12(B) of the UGC Act. 1956
NAAC Accredited

Ref. No. ----------

Date: 06/05/2023

Notice

All Teaching, Non-Teaching Staff and Students of Polba Mahavidyalaya are hereby informed that the Department of Geography in collaboration with IQAC is going to organize an Add on Course entitled "Application of GIS & Remote Sensing in Disaster Study" during 23rd May, 2023 to 5th June, 2023 at the College premises.
Interested students are requested to enroll their name in this course immediately.

Rittajoa 6/5/2023
HOD
Department of Geography

6/5/23.
Coordinator
IQAC

06/5/2023.
Teacher-in-Charge

Teacher in Charge
Polba Mahavidyalaya
Polba, Hooghly, West Bengal

POLBA MAHAVIDYALAYA Estd- 2005 Dist. Hooghly

List of Students Enrolled in the Add On Course "Application of Remote Sensing and GIS in Disaster Study" for the session 2022-23

Sl No	Roll No	Subject	Semester	Name	Signature
1	301	Geography		Souvik Mondal	Souvik Mondal
2	302	Geography		Ramadip Roy	Ramadip Roy
3	303	Geography		Soumili Mukherjee	Soumili Mukherjee
4	304	Geography		Sayani Ghosh	Sayani Ghosh
5	305	Geography		Shreya Ghosh	Shreya Ghosh
6	307	Geography		Gulsamara Begam	Gulsamara Begam
7	308	Geography		Anirban Das	Anirban Das
8	309	Geography		Nowshin yasmin	Nowshin yasmin
9	310	Geography		Sayan Bauldas	Sayan Bauldas

Rituparna Hajra
HoD, Department of Geography

Teacher-in-Charge

POLBA MAHAVIDYALAYA ★ Estd- 2005 ★ Dist. Hooghly

Teacher in Charge
Polba Mahavidyalaya
Polba, Hooghly, West Bengal

Add on :- Application of GIS & Remote Sensing in Disaster Study

Course Commenced on and from 23/05/2023 upto 05/06/2023

REGISTER OF ATTEND-ANCE OF PUPILS

FOR THE MONTH OF May–June 2023

Serial No.	Roll No.	NAME OF PUPILS	Sl. No. & dt. of Adm. in the Adm. Reg.	ATTEND-ANCE																													No. of days				
				RH 1	Su 2	RH 3	RH 4	Fr 5	Sa 6	Su 7	Mo 8	Tu 9	We 10	Th 11	Fr 12	Sa 13	Su 14	Mo 15	Tu 16	We 17	Th 18	Fr 19	Sa 20	Su 21	RH 22	Mo 23	RH 24	Th 25	Fr 26	Sa 27	Su 28	Mo 29	Tu 30	We 31	Present	Late Present	Absent on Leave	Absent without Leave
1.	301	Sourik Mondal		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
2.	302	Ranadip Roy		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
3.	303	Soumili Mukherjee		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
4.	304	Sayani Ghosh		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
5.	305	Shreya Ghosh		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
6.	307	Gulsanara Begam		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
7.	308	Anirban Das		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
8.	309	Nowshin Yasmin		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
9.	310	Sayan Baul Das		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			

REMARKS

POLBA MAHAVIDYALAYA

Post Office - Polba, District – Hooghly, West Bengal, Pin - 712148

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NAAC Accredited

Certificate of Participation

This is to certify that

Anirban Das (B.A. Honours, Sem VI), has successfully completed Add-on course entitled "Application of Remote Sensing and GIS in Disaster Study" organised by the Department of Geography and IQAC, Polba Mahavidyalaya, Polba, Hooghly-712148, from 23rd May to 5th June 2023, and obtained Grade A+

Rituparna Hajra
HOD, Dept. of Geography
(Dr. Rituparna Hajra)

IQAC Co-Ordinator
(Dr. Santanu Sengupta)

Teacher-in-charge
(Mr. Narugopal Kaibarta)

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NAAC Accredited

Certificate of Participation

This is to certify that

Sayan Bauldas (B.A. Honours, Sem. VI), has successfully completed Add-on course entitled "Application of Remote Sensing and GIS in Disaster Study" organised by the Department of Geography and IQAC, Polba Mahavidyalaya, Polba, Hooghly-712148, from 23rd May to 5th June 2023, and obtained Grade A.

Rituparna Hajra
HOD, Dept. of Geography
(Dr. Rituparna Hajra)

IQAC Co-Ordinator
(Dr. Santanu Sengupta)

Teacher-in-charge
(Mr. Narugopal Kaibarta)

MAHAVIDYA 2005 Dist.- Hooghly

Course Commenced on and from 23/05/2023
upto 05/06/2023

REGISTER OF ATTENDANCE OF PUPILS

FOR THE MONTH OF May–June 2023

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				RH 1 23/5	Su 2 23/5	RH 3 23/5	RH 4 29/5	RH 5 29/5	RH 6 29/5	RH 7 29/5	RH 8 29/5	RH 9 29/5	RH 10 29/5	RH 11 29/5	RH 12 29/5	RH 13 29/5	Su 14 29/5	RH 15 29/5	Th 16 29/5	Fr 17 29/5	Sa 18 29/5	Su 19 29/5	Sa 20 29/5	Su 21 29/5	RH 22 29/5	Su 23 29/5	RH 24 29/5	Th 25 01/06	Fr 26 01/06	Sa 27 01/06	Su 28 01/06	Th 29 01/06	Fr 30 01/06	31	Present	Late Present	Absent on Leave	Absent without Leave
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2.	302	Ranadip Roy		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
3.	303	Soumili Mukherjee		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
4.	304	Sayani Ghosh		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
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8.	309	Nowshin Yasmin		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30			
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No. Present daily ... ...

No. Absent daily ... ...

TOTAL ...

REMARKS

SREEMA TRADERS, 45 Beniatola Lane, Kolkata - 9 Ph.2219 3865

Hindus - Muslims - + Others -

No. of Free Students - No. of ½ Free Students -

No. of working days during the Month -

Average Daily Attendance -

Percentage of Attendance during the Month -

Name - Sayani Ghosh
Roll - 304

20

Polba Mahavidyalaya
Polba, Hooghly
Add On Course (23rd May, 2023 to 5th June, 2023) Assessment
Subject: Application of GIS & Remote Sensing in Disaster Study

Time: 1 hr Total Marks: 20

Answer all questions:

1. Which of the following best describes the role of GIS in disaster management?
   A. Analyzing meteorological data
   B. Managing disaster response teams
   C. Mapping and analyzing spatial data to support decision-making
   D. Generating financial reports for disaster relief

2. What type of remote sensing data is most commonly used to monitor flood extent?
   A. Optical imagery
   B. Thermal imagery
   C. Radar imagery
   D. LiDAR data

3. In the context of disaster management, what does DEM stand for?
   A. Digital Elevation Model
   B. Data Extraction Method
   C. Disaster Evaluation Metric
   D. Dynamic Earth Model

4. Which remote sensing technique is particularly useful for tracking wildfires?
   A. Landsat imagery
   B. SAR (Synthetic Aperture Radar)
   C. MODIS (Moderate Resolution Imaging Spectroradiometer)
   D. Hyperspectral imaging

5. How can GIS be used to assess earthquake damage?
   A. By analyzing soil moisture levels
   B. By mapping structural damage and infrastructure impacts
   C. By predicting future earthquake occurrences
   D. By tracking temperature changes

6. What is the primary advantage of using satellite imagery over aerial photography for disaster monitoring?
   A. Higher resolution
   B. Greater coverage and accessibility
   C. Lower cost
   D. Easier to interpret

7. Which GIS function is used to combine multiple layers of spatial data to analyze disaster risk?
   A. Buffering
   B. Overlay analysis
   C. Clipping
   D. Digitizing

8. Remote sensing can detect which of the following parameters to monitor drought conditions?
   A. Soil moisture

B. Atmospheric pressure
C. Ocean currents
D. Wind speed

9. Which of the following GIS tools is used to identify areas at risk of landslides?
A. Proximity analysis
B. Network analysis
C. Suitability analysis
D. Temporal analysis

10. What is the main advantage of using GIS for evacuation planning during a natural disaster?
A. It can predict the exact timing of the disaster.
B. It helps in visualizing and optimizing evacuation routes.
C. It provides real-time weather updates.
D. It generates financial aid estimates.

11. Which type of remote sensing data would be most useful for monitoring coastal erosion?
A. Landsat imagery
B. LiDAR data
C. Thermal infrared imagery
D. SAR data

12. In disaster studies, what does "hazard mapping" refer to?
A. Mapping the location of emergency services
B. Identifying areas prone to specific types of disasters
C. Tracking the spread of disease
D. Estimating the financial cost of disasters

13. What type of data would you use from GIS to assess the impact of a tsunami?
A. Land use data
B. Vegetation cover data
C. Bathymetric data
D. Air quality data

14. How can GIS be utilized in post-disaster recovery?
A. By providing real-time data on the event's progress
B. By analyzing social media for disaster reports
C. By mapping damaged areas to prioritize recovery efforts
D. By generating weather forecasts

15. Which remote sensing technique is best suited for monitoring changes in vegetation health during a disaster?
A. Hyperspectral imaging
B. SAR (Synthetic Aperture Radar)
C. Thermal infrared imaging
D. Optical satellite imagery

16. What is the purpose of using GIS in risk assessment for natural hazards?
A. To determine the economic impact of disasters
B. To predict the occurrence of natural hazards
C. To identify and map vulnerable areas and populations
D. To assess the performance of emergency response teams

17. **Which remote sensing data type is most effective for detecting oil spills?**
    A. Optical imagery
    B. LiDAR data
    C. Radar imagery
    D. Thermal infrared imagery

18. **In GIS, what does the term "spatial analysis" refer to in the context of disaster management?**
    A. Analyzing the temporal changes in disaster data
    B. Analyzing data based on its geographic location and relationships
    C. Assessing the economic impacts of disasters
    D. Generating financial aid distributions

19. **Which remote sensing technology is most commonly used to assess damage caused by hurricanes?**
    A. Optical satellite imagery
    B. Ground-penetrating radar
    C. Infrared thermography
    D. Acoustic sensors

20. **How does remote sensing contribute to early warning systems for natural disasters?**
    A. By providing real-time updates on social media
    B. By detecting changes in environmental conditions that precede disasters
    C. By managing logistics for disaster relief
    D. By forecasting financial impacts of disasters

Soumili Mukherjee
(Roll - 303)

18

Polba Mahavidyalaya
Polba, Hooghly
Add On Course (23rd May, 2023 to 5th June, 2023) Assessment
Subject: Application of GIS & Remote Sensing in Disaster Study

Time: 1 hr **Total Marks: 20**

POLBA MAHAVIDYALAYA Estd-2005

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Ranadip Ray
(Roll - 302)

POLBA MAHAVIDYALAYA Estd- 2005 Dist. Hooghly

Polba Mahavidyalaya
Polba, Hooghly
Add On Course (23rd May, 2023 to 5th June, 2023) Assessment
Subject: Application of GIS & Remote Sensing in Disaster Study

Time: 1 hr **Total Marks: 20**

Answer all questions:

1. Which of the following best describes the role of GIS in disaster management?
A. Analyzing meteorological data
B. Managing disaster response teams
C. Mapping and analyzing spatial data to support decision-making
D. Generating financial reports for disaster relief

2. What type of remote sensing data is most commonly used to monitor flood extent?
A. Optical imagery
B. Thermal imagery
C. Radar imagery
D. LiDAR data

3. In the context of disaster management, what does DEM stand for?
A. Digital Elevation Model
B. Data Extraction Method
C. Disaster Evaluation Metric
D. Dynamic Earth Model

4. Which remote sensing technique is particularly useful for tracking wildfires?
A. Landsat imagery
B. SAR (Synthetic Aperture Radar)
C. MODIS (Moderate Resolution Imaging Spectroradiometer)
D. Hyperspectral imaging

5. How can GIS be used to assess earthquake damage?
A. By analyzing soil moisture levels
B. By mapping structural damage and infrastructure impacts
C. By predicting future earthquake occurrences
D. By tracking temperature changes

6. What is the primary advantage of using satellite imagery over aerial photography for disaster monitoring?
A. Higher resolution
B. Greater coverage and accessibility
C. Lower cost
D. Easier to interpret

7. Which GIS function is used to combine multiple layers of spatial data to analyze disaster risk?
A. Buffering
B. Overlay analysis
C. Clipping
D. Digitizing

8. Remote sensing can detect which of the following parameters to monitor drought conditions?
A. Soil moisture

B. Atmospheric pressure
C. Ocean currents
D. Wind speed

9. Which of the following GIS tools is used to identify areas at risk of landslides?
A. Proximity analysis
B. Network analysis
C. Suitability analysis
D. Temporal analysis

10. What is the main advantage of using GIS for evacuation planning during a natural disaster?
A. It can predict the exact timing of the disaster.
B. It helps in visualizing and optimizing evacuation routes.
C. It provides real-time weather updates.
D. It generates financial aid estimates.

11. Which type of remote sensing data would be most useful for monitoring coastal erosion?
A. Landsat imagery
B. LiDAR data
C. Thermal infrared imagery
D. SAR data

12. In disaster studies, what does "hazard mapping" refer to?
A. Mapping the location of emergency services
B. Identifying areas prone to specific types of disasters
C. Tracking the spread of disease
D. Estimating the financial cost of disasters

13. What type of data would you use from GIS to assess the impact of a tsunami?
A. Land use data
B. Vegetation cover data
C. Bathymetric data
D. Air quality data

14. How can GIS be utilized in post-disaster recovery?
A. By providing real-time data on the event's progress
B. By analyzing social media for disaster reports
C. By mapping damaged areas to prioritize recovery efforts
D. By generating weather forecasts

15. Which remote sensing technique is best suited for monitoring changes in vegetation health during a disaster?
A. Hyperspectral imaging
B. SAR (Synthetic Aperture Radar)
C. Thermal infrared imaging
D. Optical satellite imagery

16. What is the purpose of using GIS in risk assessment for natural hazards?
A. To determine the economic impact of disasters
B. To predict the occurrence of natural hazards
C. To identify and map vulnerable areas and populations
D. To assess the performance of emergency response teams

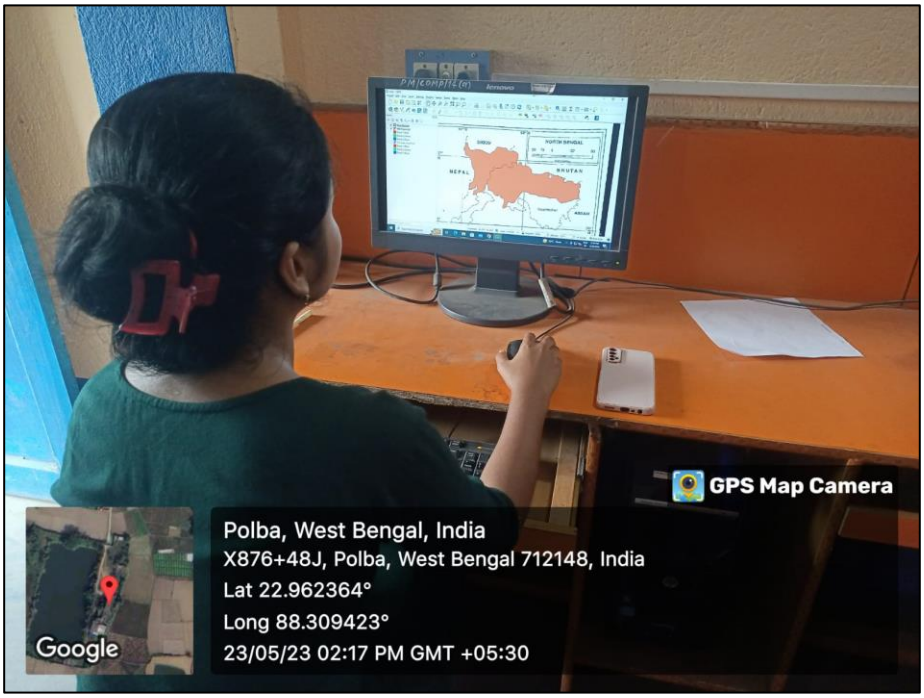
17. **Which remote sensing data type is most effective for detecting oil spills?**
    A. Optical imagery
    B. LiDAR data
    C. Radar imagery
    D. Thermal infrared imagery

18. **In GIS, what does the term "spatial analysis" refer to in the context of disaster management?**
    A. Analyzing the temporal changes in disaster data
    B. Analyzing data based on its geographic location and relationships
    C. Assessing the economic impacts of disasters
    D. Generating financial aid distributions

19. **Which remote sensing technology is most commonly used to assess damage caused by hurricanes?**
    A. Optical satellite imagery
    B. Ground-penetrating radar
    C. Infrared thermography
    D. Acoustic sensors

20. **How does remote sensing contribute to early warning systems for natural disasters?**
    A. By providing real-time updates on social media
    B. By detecting changes in environmental conditions that precede disasters
    C. By managing logistics for disaster relief
    D. By forecasting financial impacts of disasters

Photographs

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