

Online CERTIFICATE COURSE In
REMOTE SENSING & GIS (OCC-RSG)
(Theory and Practical)

With Special reference to Q GIS

Duration: 3 Months (Saturday and Sunday)

Stating Date: 17.10.2021

Eminent Resource Persons

Dr Niladri Das

Assistant Professor, Department of Geography,
Hiralal Bhakat College, Nalhati, Birbhum

Dr. Rejaul Islam Sana

Assistant Professor, Department of Geography,
Hiralal Bhakat College, Nalhati, Birbhum

Duration of the Course

Total Days: 24 Days

Total Time: 90 Hours

Theory (2 Credits)

Practical (1 Credit)

Assignment (1 Credit)

Content of Hands on Training in Q GIS

1. Georeferencing of raster image
2. Vector data generation and Digitization
3. Data attachment
4. Thematic mapping
5. Layout preparation
6. Satellite image classification
7. Remote sensing indices like NDVI, NDWI, NDBI
8. Extraction of land surface temperature
10. Preparation of contour mapping from google map
11. Preparation of DEM
12. Slope map, aspect, hill shade from DEM
13. Prediction map using ANN model

WhatsApp Us for Full Course Guide and More Details

+91 8388091239

Jointly Organized by



The Department of Geography
Hiralal Bhakat College
a Government Aided Degree College
Affiliated by The University of Burdwan
Nalhati, Birbhum, West Bengal – 731220



**Centre for Environmental Research,
Education and Development (CERED)**
An Constituent body of
Hariharpur Friends of Environment
A Government registered organization
West Bengal, India

REGISTRATION

Student INR 2000/- ; Research Scholar and Company or Organization personnel's INR 2500/- & Faculty and Teachers: INR 3000/-

CONTACT

Registration Link: <https://forms.gle/tgJTUaaAu2C7mRmKA>

info.cered@gmail.com ; +91 8388091239

Payment Link: <https://imjo.in/2EgcwV>

Last Date of Registration: 3rd October, 2021

COURSE GUIDE

ONLINE CERTIFICATE COURSE ON REMOTE SENSING & GIS (OCC - RSG)

(Theory and Practical)

Jointly Organized by



The Department of Geography, Hiralal Bhakat College
A Govt. Aided Degree College
Affiliated to the University of Burdwan
Nalhati, Birbhum, West Bengal - 731220, India



Centre for Environmental Research
Education and Development (CERED)
Hariharpur Friends of Environment
Arambagh, Hoogly, West Bengal - 712601, India
Regn No. : S0000799 of 2018-19

About the Programme

With the advancement of science and technology today data collection, interpretation, analyzing have become quite easy. Remote sensing is basically a science and also an art of acquiring, assessing, and also analyzing data. Remote sensing along with GIS serves as an effective tool for assessment, management, prediction of different resources that are present not only in the earth's surface but also in other accessible planetary bodies. A large amount of geospatial data nowadays are obtained from various sources and they are used in various assignments and projects in the form of secondary data sets. Satellite imagery along with the Geographic Information Systems acts as a great tool for supporting environmental management, resource management, disaster management, global climate change, forest and wildlife conservation, land use and land cover mapping etc. The GIS based softwares provide an excellent platform for integration of all types of geospatial data having different attributes. These helps in different types of modeling like hydrological modeling, climate modeling, soil mapping etc. and all these are done on the basis of spatio-temporal data. In this programme, we will provide a detailed lecture on the overview of Remote sensing and GIS and also discuss the sources of various satellite based geospatial data, we will provide classes on hands-on training on QGIS software so that learners can perform the operations of their own using this software. This programme is inter-disciplinary, any discipline from both pure science and social science can access this programme.

Programme Team

Eminent Resource Persons

Dr Niladri Das

Assistant Professor, Department of Geography, Hiralal Bhakat College, Nalhati, Birbhum

Dr. Rejaul Islam Sana

Assistant Professor, Department of Geography, Hiralal Bhakat College, Nalhati, Birbhum

Coordinators

Academic Coordinator

Dr. Mousumi Pal

Centre for Environmental Reserch Education and Development

Course Coordinator

Ms. Ananya Chatterjee

Centre for Environmental Reserch Education and Development

Mr. Biswajit Mondal

*SACT, Department of Geography
Hiralal Bhakat College*



About Friends of Environment

The Environmental Science subject not only gives you a degree but also encourages the wisdom to flourish an Eco-friendly attitude towards our society. We, the Hariharpur Friends of Environment (A Community of Environmental Science Degree Holders in West Bengal, India) leading our activities through Environmental Education Awareness camps, rallies, free health checkup camps, sanitary hygiene practices camps, tree plantation drives, waste monitoring, and handling practice camps, etc. We used to provide free environmental education among the needy students of various primary schools, high schools, colleges, and as well in different sectors of our society. We started our journey in May 2017 and continue to devote ourselves to the betterment of our nature and society.

Objectives of Friends of Environment

- Enhancing active participation of all sections of society in nature conservation and environmental protection through environmental education, awareness and capacity building.
- Promoting the active involvement of rural and traditional communities in the sustainable management and conservation of natural resources.
- To arrange for extension lectures, debates, group discussion, workshop, seminars, conferences, educational tours, exhibitions etc.
- To impart training by making contract or collaboration with Govt. other NGOs, consultant and institution.

- To provide education to Rural and Urban citizens for upliftment of their lives.
- To acquire, establish, start, aid, run maintain or manage educational institutes, libraries for the benefit of the public
- To study, cultivate and demonstrate environmental awareness.

About the Centre

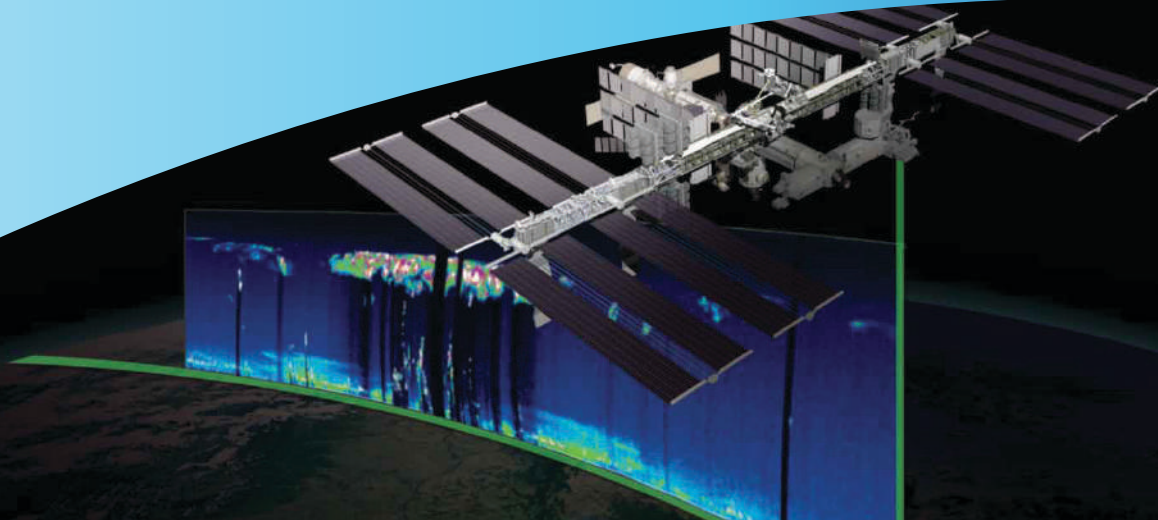
Centre for Environmental Research Education and Development (CERED) is a constituent body of Hariharpur Friends of Environment organization. CERED Promotes Fundamental advances in understanding and in factual knowledge are needed to solve urgent environmental problems through Research, Education and Development. The main objective of CERED is to create an environment for effective teaching learning by encouraging the students and faculty to nurture their intellectual curiosity and scientific and research temperament. CERED expand the area of knowledge through collaboration with any Govt. and Non-Govt. organizations, academic institutions like schools, college, universities etc., different management institutes, non-government organizations, even industry or business/corporate houses in Indian and abroad, in such a manner as may be necessary for the promotion of the objectives of the Hariharpur Friends of Environment.

About Hiralal Bhakat College

Hiralal Bhakat College is located in the Rampurhat sub-division of the district of Birbhum in West Bengal. Situated in a backward area, it is a co-education college affiliated to the University of Burdwan. The College has 1.4 acres (5666 square meters) of land and is geographically located in a semi-urban rural area. Situated by the Panagarh-Morgram Expressway, this college is well connected with the capital and other important places of West Bengal. The College received recognition from the University Grants Commission (UGC) under 2(f) as Hiralal Bhakat College on 18th October 1993. It is without doubt that the goals and objectives of such a college located in a rural and backward area would always be society dependant and case specific. The college started and proceeds with the simple goal of making people conscious, of producing graduated out of first generation learners, of churning out responsible and conscientious citizens for the nation, and of constructing outputs who would be able to control their own destiny and livelihood with their own efforts. Hence, the objectives of the college are to provide the students with education which does not cost much and with minimum facilities under one roof so as to enable them to prosper in their lives and be instrumental in the uplift in the real sense of the term. The same are made known to the students from time to time through the college prospectus as well as college magazines and through interactions with the faculty and staff of the college.

About the Department

The Department of Geography has started its journey from 2008 with a General Course of Undergraduate Programme. Later it was upgraded by an Honours Course from 2013. At present the Department includes three Assistant Professors, four SACTs and one Laboratory Attendant. The Department is facilitated by a well equipped general laboratory and a RS & GIS laboratory with proper internet connection. Following the University prescribed syllabus, student-computer ratio is routinely maintained in the RS & GIS laboratory. An annual Field Study is conducted by the Department and each student of Semester-V submit a Field Report to fulfill their Undergraduate Programme. Having a good student-teacher ratio, the Department always bears a rare personal relationship. Students can also follow a Youtube channel entitled 'World of Geography, Hiralal Bhakat College' to revisit some important classes. Teachers demonstrate practical classes in audio-visual mediums to grow a user-friendly attitude of students towards equipment. Recently an ICSSR funding Research Project was completed in this Department successfully.



INTRODUCTION TO THE COURSE

GENERAL INTRODUCTION

The Online Certificate Course in Remote Sensing and GIS (OCC-RSG) organized by Department of Geography, Hiralal Bhakat College and Centre for Environmental Research Education and Development, Hariharpur Friends of Environment, aims at providing knowledge to the learners in the areas of Remote sensing, GIS and its application in different fields. The duration of the course is 3 Months (Saturday and Sunday), and it includes Theory (2 Credits), Practical (1 Credits) and Assignments (1 Credits) and the basic eligibility criteria of the course is 10+ 2 or Equivalent. This programme is inter disciplinary, any disciplines from pure science and social science can access this programme.

ELIGIBILITY CRITERIA

Candidates should have passed / pursuing Graduation or Post Graduation from any recognized university.

RESPONSE LANGUAGE

Candidates must write their examinations and other forms of assessment in English, as the response language. Assessed work in theory of knowledge and the extended essay must also be presented in English.

DURATION OF THE COURSE

3 Months (Saturday and Sunday)

REGISTRATION DETAILS

Mode of Registration: Online through Google Forms
Registration Open: 01st September 2021 (Wednesday)
Last Date of Registration: 03rd October 2021 (Sunday)

MODES OF CLASSES AND EXAMINATION

Online Classes will be Conducted Through Google Meet

COURSE STRUCTURE

Total Number of Classes : 24

Total Time : 90 hrs.

The Online Certificate Course in Remote Sensing and GIS (OCC-RSG) Consists of Total 4 Credits i.e.,

Theory (2 Credit)

Practical (1 Credit)

Assignment (1 Credit)

FEES STRUCTURE

The fee structure for Online Certificate Course in Remote Sensing and GIS (OCC-RSG) is as follows:

Students : ₹ 2000/-

Research Scholar : ₹ 2500/-

Faculty : ₹ 3000/-

There is no separate Examination fees.

EVALUATION

Evaluation consists of two parts: Evaluation Through Assignments and term-end Examination. In the result evaluation through Assignment consists of 25% and 75% will be given to term end examination. Candidates should have score at least 35% marks in both assignments and term end examination separately to get the certificate in 'Online Certificate Course in Remote Sensing and GIS (OCC-RSG).

ASSIGNMENTS AND EXAMINATION

Total 6 assignments will be given, out of which the best 5 assignments will be selected. Three Term end exam will be there at the end of each the month.

ELIGIBILITY FOR THE EXAMINATIONS

To be eligible to appear in the term-end examination in any Course, Candidates should have submitted the assignments for the respective Course and should have Minimum 75% attendance in classes.

USEFUL CONTACTS

Academic, Exam and other relating to course :

Academic Coordinator,
Centre for Environmental Research Education and Development
Hariharpur Friends of Environment,
Arambagh, Hooghly, West Bengal- 712601
Contact: info.cered@gmail.com

Purchasing of Video Clips, Power Points of the Course and Study Materials :

Technical Coordinator,
Hariharpur Friends of Environment
Contact: info.cered@gmail.com

USEFUL DATES AND LINKS

Starting of Registration : 01st September, 2021

Closing of Registration : 03rd October, 2021

Class Starting Date : 17th October, 2021

Registration Links : <https://forms.gle/tgJTUaaAu2C7mRmKA>

Payment Link : <https://imjo.in/2EgcwV>

Contact Us : info.cered@gmail.com

+91 8388091239



SYLLABUS

THEORY

PHYSICS OF REMOTE SENSING : Definition, Concept and Principles, Orbital Characteristics of Satellite-Kepler's law of Planetary motion, EMR and its Characteristics, Wavelength Regions and their significance, Interaction of EMR with earth surface features and atmosphere, Spectral signatures and visual interpretation keys.

EO PLATFORMS AND SENSORS : Active and Passive, classification of platforms on the basis of position-Space borne, Air borne; Classification on the basis of Bands-Panchromatic, Multispectral, Hyper spectral; Sensor Resolution; Sensors-Optical, SAR, Thermal; Weather and Communication satellites, Resolution types.

VISUAL IMAGE INTERPRETATION : Elements of Visual Image Interpretation, Interpretation keys, Generation of Thematic Maps.

DIGITAL IMAGE PROCESSING : Introduction; Filters; Detectors; Scanning techniques-Across track and along track; Thermal remote sensing-Blackbody Radiation, Thermal imaging; Pre-processing (Radiometric and Geometric correction), Image Enhancement, Image Classification (Unsupervised and Supervised) and Accuracy assessment.

GPS and GNSS : Satellite based positioning system, working principle of GPS, Errors in GPS, Positioning method, GPS receivers, Application of GNSS

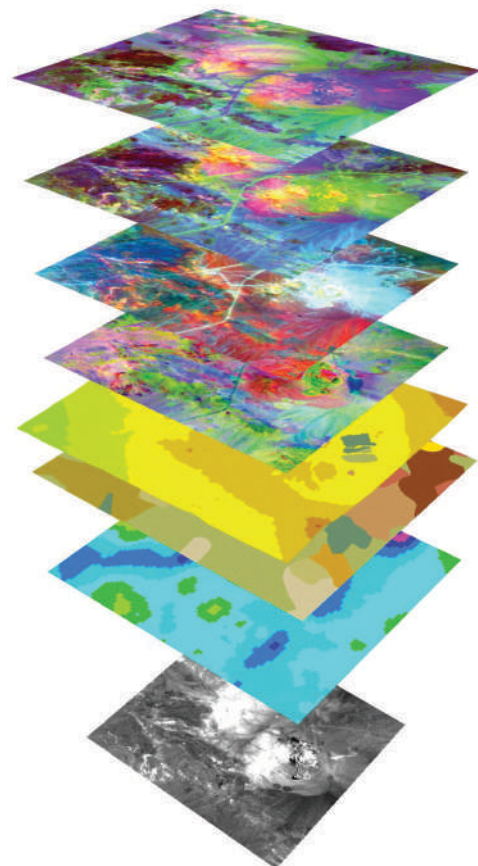
GIS : Introduction, components, GIS data sources, Spatial and attribute data, GIS data formats (coverage, geodatabase, shapefile, grid, dxf, dwg, geotiff, GML), Attribute types (nominal, ordinal, interval, ratio), Spatial Data Models (Raster and Vector), Digitizing, Editing and structuring map data, Concept of Topology, spaghetti; Map overlay, spatial join, Buffering analysis.

APPLICATION OF REMOTE SENSING : Land cover and Land Use, Agricultural Sector, Forestry, Hydrology, Mapping, Oceans and Coastal Monitoring.

PRACTICAL

Practical knowledge of QGIS software. All components of QGIS software. How to prepare maps using QGIS. Analysing and editing spatial information using QGIS.

1. Georeferencing of raster image
2. Vector data generation
3. Digitization
4. Data attachment
5. Thematic mapping
6. Layout preparation
7. Satellite image classification
8. Remote sensing indices like NDVI, NDWI, NDBI
9. Extraction of land surface temperature
10. Preparation of contour mapping from google map
11. Preparation of DEM
12. Slope map, aspect, hillshade from DEM
13. Prediction map using ANN model



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COURSE SYLLABUS & TIMINGS

Week	Class and Date	Topics	Sub Topics	Time
Week 1	Class 1 Saturday	PHYSICS OF REMOTE SENSING	Definition, Concept and Principles	2 hrs
	Class 2 Sunday	PHYSICS OF REMOTE SENSING	Orbital Characteristics of Satellite-Kepler's law of Planetary motion, EMR and its Characteristics	2 hrs
Week 2	Class 3 Saturday	PHYSICS OF REMOTE SENSING	Wavelength Regions and their significance, Interaction of EMR with earth surface features and atmosphere, Spectral signatures	2 hrs
	Class 4 Sunday	EO PLATFORMS AND SENSORS	Active and Passive, classification of platforms based on position-Space borne, Air borne; Classification on the basis of Bands-Panchromatic, Multispectral, Hyper spectral;	2 hrs
Assignment 1				5 hrs
Week 3	Class 5 Saturday	EO PLATFORMS AND SENSORS	Sensor Resolution; Sensors- Thermal, Optical, SAR; Weather and Communication satellites, Resolution types	2 hrs
	Class 6 Sunday	VISUAL IMAGE INTERPRETATION	Elements of Visual Image Interpretation, Interpretation keys	2 hrs
Week 4	Class 7 Saturday	VISUAL IMAGE INTERPRETATION	Generation of Thematic Maps, Examples of Visual image interpretation with sample images	2 hr
	Class 8 Sunday	DIGITAL IMAGE PROCESSING	Introduction; Filters; Detectors; Scanning techniques- Across track and along track; Thermal remote sensing- Blackbody Radiation, Thermal imaging;	2 hrs
Assignment 2				5 hrs
Week 5	Class 9 Saturday	DIGITAL IMAGE PROCESSING	Pre-processing (Radiometric and Geometric correction), Image Enhancement, Image Transformation, Image Classification (Unsupervised and Supervised), and Accuracy assessment	2 hrs
	Class 10 Sunday	GPS and GNSS	Satellite based positioning system, working principle of GPS, Errors in GPS, Positioning method	2 hrs
Week 6	Class 11 Saturday	GPS and GNSS	GPS receivers, Application of GNSS	2 hrs
	Class 12 Sunday	GIS	Introduction, GIS data sources, GIS components, Spatial and attribute data, GIS data formats (shape file, grid, geodatabase, dxf, geotiff, Coverage, dwg, GML), Attribute types (nominal, ordinal, interval, ratio);	3 hrs

September, 2021

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COURSE SYLLABUS & TIMINGS

Assignment 3				5 hrs
Week 7	Class 13 Saturday	GIS	Spatial Data Models (Raster and Vector), Digitizing, Editing and structuring map data, Topology, Map overlay, spaghetti, Buffering analysis, spatial join;	3 hrs
	Class 14 Sunday	APPLICATION OF REMOTE SENSING, GIS & GPS	Land cover and Land Use, Agricultural Sector, Forestry, Hydrology, Mapping, Oceans and Coastal Monitoring	2 hrs
Week 8	Class 15 Saturday	PRACTICAL	About Q-GIS Geo referencing of raster image	3 hrs
	Class 16 Sunday	PRACTICAL	Vector data generation Digitization Editing of Vector Data	3 hrs
Assignment 4				5 hrs
Week 9	Class 17 Saturday	PRACTICAL	Data attachment, Thematic mapping, Download Process of Satellite images and DEM	3 hrs
	Class 18 Sunday	PRACTICAL	Layout preparation , Principles of IDW, Preparation of IDW Maps, Preparation of Contour from IDW	3 hrs
Week 10	Class 19 Saturday	PRACTICAL	Extraction of Drainage from DEM, Satellite image Pre-processing	3 hrs
	Class 20 Sunday	PRACTICAL	satellite image processing and Post Processing,	3 hrs
Assignment 5				5 hrs
Week 11	Class 21 Saturday	PRACTICAL	Remote sensing indices like NDVI, NDWI, NDBI, Preparation of contour mapping from google map, Preparation of DEM Slope map, aspect, hillshade from DEM	3 hrs
	Class 22 Sunday	PRACTICAL	Buffering, Overlay Analysis with AHP Model, MIF Model	3 hrs
Week 12	Class 23 Saturday	PRACTICAL	Extraction of land surface temperature	3 hrs
	Class 24 Sunday	PRACTICAL	Conversion of different types of data sets, Prediction map using ANN model	3 hrs
Assignment 6				5 hrs

September, 2021

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