

Report on
Two months Special Course on “Hands on Skills
using Remote Sensing and GIS”
20th June 2020 to 15th August 2020

Organized by



CENTRE FOR REMOTE SENSING & GEOINFORMATICS (CRSG)
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
JEPPIAAR NAGAR, RAJIV GANDHI ROAD, CHENNAI, TAMIL NADU

Prepared by
SCIENTISTS
Centre for Remote Sensing and
Geoinformatics

August 2020

Two months Special Course on “Hands on Skills using Remote Sensing and GIS”

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Center for Remote Sensing and Geoinformatics

Sathyabama Institute of Science and Technology, Chennai

Date: 20th June 2020 to 15th August 2020

Two months Special Course on “Hands on Skills using Remote Sensing and GIS” was organized and conducted by Centre for Remote Sensing and Geoinformatics (CRSG) team of Sathyabama Institute of Science and Technology, Chennai from June 15th to August 15th through online mode as it was during Covid 19 Pandemic time.

The program aimed at awareness creation in the field of RS and GIS technology applications. Around 40 participants attended the special course. The main aim of the job oriented course was to produce qualified, motivated students who have been trained in GIS, Remote Sensing, GPS and all the related state of the art technologies

The Centre successfully conducted the two months certificate course on 'Hands-on using RS and GIS' with applications of RS & GIS in Oceanography, Geology, Atmospheric Sciences, Water resources, Agricultural Sciences and various other related fields. The program also focused on the specific applications according to the needs of participants. The Program helped the participants to understand and learn about the applications of RS and GIS in real time situations.

The course gave state of the art concept and practice of remote sensing and GIS to the learners. The course covered from fundamentals of Rs and GIS to advanced methods. The course gave comprehensive understanding on solving RS & GIS research problems in wide areas of application. The modules were designed with hands on experience to develop the skills of participants to equip them for project and research work. The course used open source software QGIS for practical applications which is freely available. Each participant was assigned a practical project work according to their field of interest with the support of mentor from CRSG, SIST. After learning the software the participants worked on the project with the directions of the mentor and finally they presented their project work. Some of the participants made publications also from their projects.

Brochure of the program

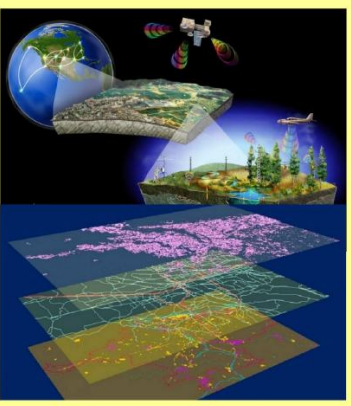


SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with Grade "A" by NAAC | Approved by AICTE



Col. Dr. Jeppiaar Research Park
CENTRE FOR REMOTE SENSING
AND GEOINFORMATICS

Organizes
2-Month Special Course on
"Hands-on Skills Using
Remote Sensing and GIS"
June 15, 2020 - August 15, 2020



AIM AND SCOPE OF THE COURSE

As each of us navigates through the impact of COVID19 in our life, Centre for Remote Sensing and Geoinformatics (CRSG) makes sure that you can find comfort in the strength of Sathyabama Institute of Science and Technology. During this time, CRSG remains as passionate as ever about helping you learn, grow, and connect with learners. CRSG, Sathyabama Institute of Science and Technology proposes to offer a two month special course on "Hand-on skills using Remote Sensing and Geographic Information System (GIS)". Remote Sensing and GIS is an emerging field and trained professionals are in great demand in various sectors including mining, infrastructure, construction, ground water, civil engineering etc. This course intends to offer the state-of-the-art concepts and practices of remote sensing and GIS to the learners. It starts with the fundamentals of remote sensing and GIS with subsequently advanced methods will be covered. This course is designed to give comprehensive understanding on the application of remote sensing and GIS in solving the research problems.

The program is designed to accommodate Engineering and science students and researchers to learn the fundamentals and use of open source software for practical applications. The course is designed with hands on training to enhance the skills of students to equip them for project work or research work. This special course will make use of the expertise of the existing faculty and will take the support of industry to complement the openings & opportunities for students in all allied disciplines. Although the program is mainly for students, this program can help working professionals as well. As it is a fully online programme participants can attend from their convenient location and some flexibility in timings also can be accommodated.

COURSE CONTENT

Module I: Fundamentals of Remote Sensing

- Introduction of Remote Sensing
- Platforms and Remote sensing sensors
- Thermal Remote Sensing
- Microwave Remote Sensing
- Applications of Remote sensing
- Geophysical parameters retrieval

Module II: Fundamentals of Geographic Information System

- Introduction to GIS: Definition and Usefulness of GIS Components of GIS Computer Hardware, Software Modules and Organizational context of GIS.
- Introduction to Data Types-Map projections and Datum-Introduction to Scales and Toposheets - Introduction Digital Image Processing - Image Rectification - Introduction to Image enhancement - Introduction to Image Interpretation - Elements of Visual Interpretation
- Spatial Analysis and Map Design : Characteristic of Spatial Data - Spatial data storage - Manipulation and analysis - GIS data quality - Simple Data Retrieval, Conversion vector to raster data, Map Overlaying, GIS Applications. Map Production - Map design components and Map Composer
- Methods of Spatial Interpolation: Methods of Interpolation - Surface Interpolating- Kriging to Large Areas - Procedure for Setting GIS- Statistics Areas.
- Digital Elevation Modelling: Need for Three Dimensional Models Methods of DEM Products of DTM (Contour Maps, Shaded Relief Map, Maps Related to Slopes, Line Sight Maps, Drainage Analysis, Volume Estimation etc.) Usefulness of DEM/DTM.
- GPS: Concepts of GPS GPS Instruments.Applications of GPS. GPS and GIS integration Connecting and Navigating with GPS Editing and Exporting the data into GIS environment Vehicle Tracking.

Module III: Applications of Remote Sensing and GIS in various fields

- Climate studies
- Coastal zone mapping
- Mangrove wetlands
- Natural Resource Management
- Land use mapping
- Flood mapping
- Agriculture
- Water resources
- Paleo - Climatic Studies

Module IV: Online Pilot Projects guided by the Instructors

ELIGIBILITY

This is a specially structured course for professionals and academicians who want to learn GIS and Remote Sensing. This program is intended for UG, PG, PhD students and faculty members of any University /Research Centres. The fully online course starts from July 2020. Certificate will be issued upon successful completion of the course with all formalities and requirements.

COURSE FEE

Fees :Rs. 1000/-

HOW TO APPLY

Fill the applications in the given online application form link to register for the certificate course.

COLLABORATION

This course has been organized in academic collaboration with Department of Civil Engineering, Sathyabama Institute of Science and Technology and external collaborations with

- IIT Madras
- Anna University
- University of Madras
- Bharathi Womens college (University of Madras)

ABOUT THE CENTRE

Centre for Remote Sensing and Geoinformatics (CRSG) has been established during 2004 in the Sathyabama University campus as a joint initiative of Indian Space Research Organization (ISRO), Government of India and Sathyabama University. This Centre was inaugurated by Dr.K.Kasturirangan, the former ISRO Chairman and Secretary of Department of Space, Government of India. The CRSG focus

development of "Centre for Excellence" through novel research approach on a long term and policy-oriented research studies in the area of Remote Sensing and Geographical Information System (GIS).

CRSG is one of the nodal Centre for conducting training programs in India identified by NRDMs and NNRMS. CRSG has acquired 28 projects and 11 consultancy projects from various funding agencies. CRSG is a spearhead of ISRS Chennai Chapter.

IMPORTANT DATES

Last Date to Apply - June 13th, 2020
Start date - June 15th, 2020

For more information and further clarification Contact



ORGANIZING SECRETARY

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(Deemed to be University)
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Convener
Scientists
Centre for Remote Sensing and Geoinformatics
Sathyabama Institute of Science and Technology
Chennai 119

COURSE DURATION AND STRUCTURE

The course is for 2 months duration, comprising of four modules. The first and second module is common to all the participants, which deals with Geospatial Technologies focusing on Fundamentals of Remote Sensing & GIS. In the third module, the participants will be exposed to application of geospatial technologies in their respective specialisations. Participants will carry out a pilot project in the fourth module. The number of hours devoted to each module for its theory and practicals is given in the Table below:

Modules	Total theory classes	Total Practical classes	Overall hrs for each module
Module 1	5 hours	5 hours	10 hours
Module 2	6 hours	12 hours	18 hours
Module 3	Various Applications using RS and GIS	-	10 hours
Module 4	Participants do mini projects	-	10 hours

TARGET PARTICIPANTS

This course is targeted for those who are interested to learn about the Remote Sensing and GIS technologies and their applications in various fields of science and

Timetable of the program

PROGRAMME SCHEDULE – 2 MONTHS SPECIAL COURSE ON “HANDS ON SKILLS USING REMOTE SENSING AND GIS”

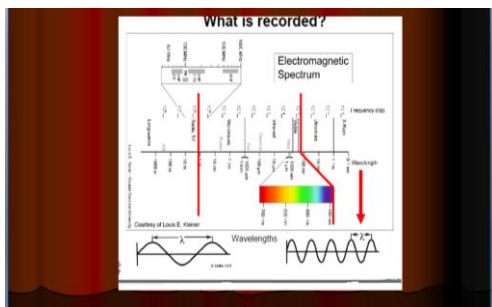
Date	Time	Topic	Theory/Practical	Speaker
MODULE 1				
15-06-20	2-00-3.00 PM	Introduction of Remote Sensing	Theory	Dr.K.Nagamani
16-06-20	2-00-3.00 PM	Platforms and Remote Sensing Sensors	Theory	Mrs.P.Mohana
17-06-20	2-00-3.00 PM	Thermal Remote Sensing	Theory	Dr.Anoop Kumar Mishra
18-06-20	2-00-3.00 PM	Microwave Remote Sensing	Theory	Dr.Anoop Kumar Mishra
19-06-20	2-00-3.00 PM	Applications of Remote Sensing	Theory/Practical	Dr.MarykuttyAbraham
Saturday & Sunday no classes				
22-06-20	2-00-3.00 PM	Satellite Data Downloading	Practical	Dr.K.Nagamani
23-06-20	2-00-3.00 PM	Remote Sensing Sensors usage	Practical	Mrs.P.Mohana
24-06-20	2-00-3.00 PM	Geophysical Parameters Retrieval	Practical	Dr.Anoop Kumar Mishra
MODULE 2				
25-06-20	10-03.00 PM	Introduction to GIS: Definition and Usefulness of GIS Components of GIS Computer Hardware, Software Modules and Organizational context of GIS.	Theory	Dr.K.Jayakumar
26-06-20	10-3.00 PM	Introduction to Data Types-Map projections and Datum-Introduction to Scales and Toposheets - Introduction Digital Image Processing - Image Rectification - Introduction to Image enhancement	Theory	Mrs.P.Mohana

		Introduction to Image Interpretation - Elements of Visual Interpretation		
Saturday & Sunday no classes				
29-06-20	2-00-3.00 PM	Spatial Analysis and Map Design..... Characteristic of Spatial Data - Spatial data storage and Manipulation and analysis - GIS data quality - Simple Data Retrieval, Conversion vector to raster data, Map Overlaying, GIS Applications Map Production- Map design components and Map Composer	Theory	Dr.K.Nagamani
30-06-20	2-00-3.00 PM	Methods of Spatial Interpolation: Methods of Interpolation Surface Interpolating- Kriging to Large Areas - Procedure for Setting GIS- Statistics Areas	Theory	Dr.K.Nagamani
01-07-20	10-3.00 PM	Digital Elevation Modelling: Need for Three Dimensional Models Methods of DEM Products of DTM (Contour Maps, Shaded Relief, Map, Maps Related to Slopes, Line Sight Maps, Drainage Analysis, Volume Estimation etc.) Usefulness of DEM/DTM.	Theory	Mrs.P.Mohana
02-07-20	2-00-3.00 PM	GPS: Concepts of GPS, GPS Instruments Applications	Theory	Dr.K.Jayakumar

		of GPS, GPS and GIS integration Connecting and Navigating with GPS Editing and Exporting the data into GIS environment Vehicle Tracking		
03-07-20	2-00-3.00 PM	GIS PRACTICALS	Practical	Dr.PrabhuDassBatwari
Saturday & Sunday no classes				
06-07-20	10-3.00 PM	GIS PRACTICALS	Practical	Dr.PrabhuDassBatwari
07-07-20	2-00-3.00 PM	GIS PRACTICALS	Practical	Dr.PrabhuDassBatwari
08-07-20	2-00-3.00 PM	GIS PRACTICALS	Practical	Mr.Pushparaj
09-07-20	2-00-3.00 PM	GIS PRACTICALS	Practical	Mr.Pushparaj
10-07-20	2-00-3.00 PM	GIS PRACTICALS	Practical	Mr.Pushparaj
Saturday & Sunday no classes				
13-07-20	2-00 PM	GIS PRACTICALS	Applications	Dr.PrabhuDassBatwari
14-07-20	2-00 PM	GIS PRACTICALS		Dr.PrabhuDassBatwari
15-07-20	2-00 PM	GIS PRACTICALS		Dr.PrabhuDassBatwari
16-07-20	2-00 PM	GIS PRACTICALS		Mr.Pushparaj
17-07-20	2-00 PM	GIS PRACTICALS		Mr.Pushparaj
Saturday & Sunday no classes				
20-07-20	2-00 PM	GIS PRACTICALS		Mr.Pushparaj
MODULE 3				
21-07-20	2-00 PM	Climate studies	Applications	Dr.Anoop Kumar Mishra
22-07-20	2-00 PM	Coastal zone mapping	Applications	Dr.K.Nagamani
23-07-20	2-00 PM	Mangrove wetlands	Applications	Dr.K.Jayakumar
24-07-20	2-00 PM	Natural Resource Management	Applications	Dr.PrabhuDassBatwari
Saturday & Sunday no classes				

27-07-20	2-00 PM	Land use mapping	Applications	Dr.MarykuttyAbraham
28-07-20	2-00 PM	Flood mapping	Applications	Dr.MarykuttyAbraham
29-07-20	2-00 PM	Agriculture	Applications	Mrs.P.Mohana
30-07-20	2-00 PM	Water resources	Applications	Dr.MarykuttyAbraham
31-07-20	2-00 PM	Paleo - Climatic Studies	Applications	Dr.P.M.Velmurugan
Saturday & Sunday no classes				
MODULE 4				
03-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Dr.PrabhuDassBatwari
04-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Dr.PrabhuDassBatwari
05-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Dr.PrabhuDassBatwari
06-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Dr.PrabhuDassBatwari
07-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Dr.PrabhuDassBatwari
Saturday & Sunday no classes				
10-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Mr.Pushparaj
11-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Mr.Pushparaj
12-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Mr.Pushparaj
13-08-20	2-00 PM	Online Pilot Projects	PARTICIPANTS Hands-on	Mr.Pushparaj
14-08-20	2-00 PM	Presentations	PARTICIPANTS Hands-on	All Speakers
15-08-20	2-00 PM	Feedback	Participants	Valedictory

Glimpse of the Program



ENERGY INTERACTIONS IN THE EARTH'S ATMOSPHERE

Mie Scattering:

- which occurs when the wavelengths of the energy is almost equal to the diameter of the atmospheric particles
- longer wavelengths also get scattered compared to Rayleigh scatter

The diagram shows three types of scattering: Rayleigh Scattering (shorter wavelengths scattered more), Mie Scattering (all wavelengths scattered equally), and Mie Scattering for larger particles (all wavelengths scattered equally, but with more forward scattering). The direction of incident light is indicated.



Bhuvan Applications - Sectors

The screenshot shows the Bhuvan Applications - Sectors web application. It features a sidebar with navigation options: Agriculture, Forestry, Urban, and Rural. The main content area displays a map of India with various application sectors highlighted, including Agriculture, Forestry, Urban, and Rural. The interface is designed for users to explore and utilize Bhuvan's capabilities across different sectors.

Integration of RS & GIS

- Separate but equal
- Seamless integration
- Total integration

The diagram shows a stack of layers representing different data types: Topographic, Forest, Zoning, Floodplain, Wetlands, Land cover, Soil, Survey control, and Computer mapping. This illustrates how RS and GIS data can be integrated for comprehensive analysis and mapping.

