Winter School In Geospatial Science and Technology (Level 2)

Department of Science & Technology
Govt. of India

Advances in Geospatial Techniques in Ecosystem Conservation and Management

1 to 23 December 2021
In Online Mode

At

Institute of Environment Education and Research, Bharati Vidyapeeth Deemed University, Pune, Maharashtra, India

Organized by
Institute of Environment Education and Research, Bharati Vidyapeeth Deemed University, Pune, Maharashtra, India

Supported by
National Geospatial Program, Department of Science and Technology, Government of India, New Delhi

Principal Investigator

Dr. Kranti Yardi, Professor, Institute of Environment Education and Research, Bharati Vidyapeeth University, Pune,

Bharati Vidyapeeth University, Pune

Bharati Vidyapeeth, the parent organization of this University is one of the largest educational organizations in the country, established over 60 years ago. It has 171 educational units under its umbrella including 67 Colleges and Institutes of conventional and professional disciplines. Bharati Vidyapeeth University commenced its functioning on 26th April, 1996. The University has eight campuses located in different cities including New Delhi.

During the last 22 years the University has achieved higher pinnacles of academic excellence and has established its reputation to such an extent that it attracts students not only from various parts of India but also from abroad. At present, there are more than 850 overseas students from 47 countries on the rolls of constituent units of this University.

The University 305 courses in its constituent units, of which, 108 are Post Graduate, 45 are Under Graduate and 55 Diploma level courses alognwith 12 Fellowship and 5 certificate courses. The University is a throbbing center of research activities and has Ph.D. programmes in 77 subjects and M.Phil in 3 subjects.

The Bharati Vidyapeeth (Deemed to be) University is a multidisciplnary, multicampus University having 32 institutions imparting quality education in varius disciplines. All programs of the Univeristy are approved by the University Grants Commission (UGC) and the respective statutory councils. The University has been re accredited for the thrird time with an 'A+' grade by the National Assessment and Accreditation Council (NAAC) in 2017. The UGC has accorded the 12B status (UGC Act 1956) to the University. The Ministry of Human Resource Development, Government of India has awarded 'A' category to the University in 2012 based on several parameters that include innovative programs, research and infrastructure facilities. The University has mainained its rank in the top hundred universities of India consistenly since 2012 and is presently ranked at 62nd position by the National Institution Ranking Framework (NIRF) by the UGC for the year 2019.
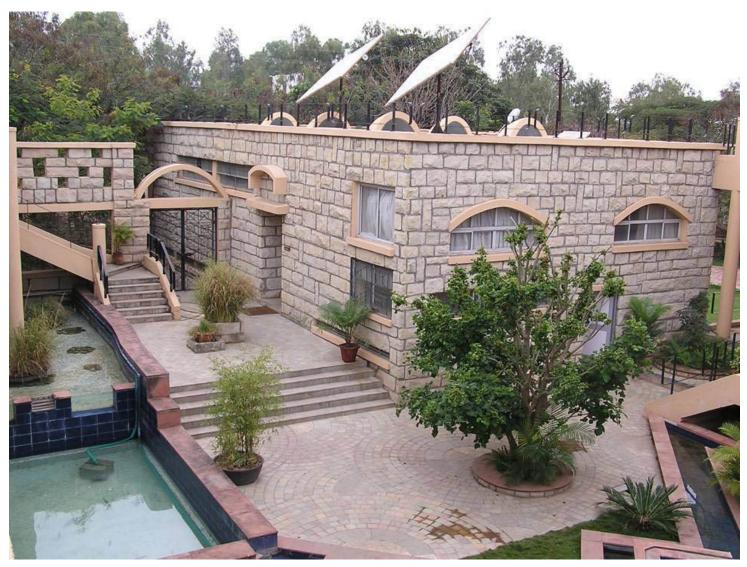
The University has created excellent infrastructure for all its constituent units, including well structured specious buildings, continuously updated laboratories and libraries and hostels with all the necessary amenities and facilities for both boys and girls. Visit us on:: https://bvuniversity.edu.in/index.php/campuses-3/pune-dhankawadi-campus

Institute of Environment Education and Research

The Institute of Environment Education and Research, Bharati Vidyapeeth (Deemed to be University) (BVIEER) is unique educational and research institution. The distinctive characteristics of the BVIEER are its wide mandate of teaching, research and extension in the fields of environment sciences, geoinformatics and wildlife conservation which have been major thrusts of the Institute. The major achievements include its projects and programs that have led to influencing environment policy and implementation of environment education at school and college level along with strategies for Protected Area Management. The Institute was asked by the NRDMS, DST to set up a portal for capacity building in geospatial technologies that can be accessed from http://dst-iget.in

The Institute actively collaborates with several international Universities and organizations and has instituted semester exchange programs and international internship programs. The faculty are well known National experts in their individual fields and this greatly enhances the teaching program.

The Institute has a major research program in both environment Science and Geoinformatics. The faculty undertake several consultancy projects at the behest of various organizations. The research projects are funded by various Government organizations such as the Ministry of Science and Technology, Department of Biotechnology, Ministry of Environment and Forests, Central Zoo Authority, Mahad Industrial Estate, etc. The research done at the Institute is cutting edge and uses an interdisciplinary approach It has completed more than 50 research projects on various aspects of conservation, wildlife management, environment education and geospatial technologies. Visit us on: https://ieer.bharatividyapeeth.edu/index.php

What is the Summer/Winter School (Level 2) Capacity Building Program in Geospatial Science and Technology

Recently knowledge has been identified as the most important driving factor for India's sustainable economic growth. India has adopted a new information regime for sustainable economic growth through its 'Digital India' program to support good governance, sustainable development goals and empowerment of its citizens. Over the last three decades, the widespread adoption of geospatial technologies into various sectors have proven to be an effective enabler to meet these challenges. The capacity building program initiatives of the National Geospatial Program (NGP) erstwhile Natural Resource Data Management System (NRDMS) Department of Science and Technology, Government of India to develop national capacity for geospatial science and technology development through diverse programs in collaboration with various partner organizations adaptation capacity of geospatial science and technology at across the country. The objective of the program is to build knowledge and various levels of governance in collaboration with academia and user agencies. The three week program is being conducted at two levels-Level 1 and Level 2. The 21-day summer/winter school in Geospatial Science and Technology (Level 2) supported by the Natural Resource Data Management System of the Department of Science and Technology, Government of India focuses on developing knowledge and capacity building in geospatial technologies through the use of geospatial software.

Level 2 Summer / Winter School In Geospatial Science and Technology

This three week program is a theme specific advanced training being implemented by eight institutions across the country. A one week online refresher session will be held prior to the commencement of the three week program.

The theme of the program at BVIEER: Winter School (Level 2 - Advanced) on ".**Advances in Geospatial Techniques in Ecosystem Conservation and Management'** focusses on developing capacity and enhancing the perspectives of the geospatial aspects of biodiversity conservation, landscape management The Summer School will focus on advanced techniques in ecosystem conservation and management aligning to SDG Goals 14 and 15 using new data sources, data analytical techniques.

Who can apply?

Faculty members, scientists, technologists, researchers from academia, national institutions of research, smart city cells, municipal corporations and other government departments, personnel from non government organizations are eligible to apply. Only 2-3 seats are reserved for research scholars. Only candidates who have a high degree of experience with geospatial technologies should apply for these advanced programs. **No basics will be covered in the Level 2 program. Candidates who have no knowledge of geospatial technologies should apply for the Level 1 program.**

How to apply?

- Interested candidates should fill the online application form through the weblink available on http://dst-iget.in. under Summer School in GST (2021-23)

- For any further queries write to dst-iget@bvieer.edu.in or call on +91-20-24375684/24362155.
- Address all queries regarding the program to the PI through email.

Important Information

Last date for registration : 15 October

Dates of the program: 1 to 23 December, 2021

Mode of conduct: Online

No. of seats: 25

Registration Fees: Nil

Principal Investigator: Dr. Kranti Yardi, Professor, Institute of Environment Education and Research, Bharati Vidyapeeth University, Pune, Maharashtra, India

Email: kranti@bvieer.edu.in

Phone: 91-20-24375684/ 24362155 / 8208708246

For any queries contact:

Dr. Kranti Yardi (Principal Investigator) or Dr. Madhurima Dey on 8055274971

Address: Institute of Environment Education and Research, Bharati Vidyapeeth University, Katraj-Dhanakwadi, Pune 411 043

Grading and Certification

Grading and Certification Participants will be assessed based on assignments completed during the course, a mini project that they are expected to complete, active participation during the training program as well as attendance.

Note: Participants must ensure that they have a laptop and a strong internet connection.

Infrastructure at the Institute of Environment Education and Research,

The Institute has well equipped laboraotires for both environment science and geoinformatics That includes state of the art software such as ArcGIS, ER-DAS, ENVI, IDRISI and other ecological and environmental software and hardware.

Boarding and Lodging facilities

The Institute has a well equipped AC guest house on the campus with a dining hall. Participants can also use the serene environments of the Guest House for a relaxing walk or run during their free time.

Serene environs and well equipped geospatial laboratory

A. One Week Self Study Module

Day and Date	Theory if any and hands on
Day 1: 17 Nov 2021	Group Introduction, Discussion on expectations from the training program; Introduction to self study tutorials: projection, georeferencing, digitization as an exercise
Day 2: 19 Nov 2021	Basics of remote sensing; Hands on exercise as self study (SAGA exercises)
Day 3: 22 Nov 2021	Satellite Image processing Techniques; Unsupervised and Supervised Hands on exercise as self study
Day 5: 24 Nov 2021	Introduction to R Programming
Day 6: 26 Nov 2021	Introduction to Python programming

Day 1: Wednesday 1 December 2021			
Inauguration Online Registration Introduction to issues in biodiversity conservation and geospatial technologies	09.30-10.00 hrs	Registration	
	10.00-11.00 hrs	Inauguration	
	11.00-11.30 hrs	**Tea break**	
	11.30-12.30 hrs	Introduction to biodiversity conservation and ecosystem management	Dr. Kranti Yardi *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-15.30 hrs	Conservation and the SDGs	Dr. Shamita Kumar *BVIEER*
	15.30-16.00 hrs	**Tea break**	
	16.00- 17.30 hrs	Conservation, SDGs and Geospatial technologies	Dr. Shamita Kumar *BVIEER*

Day 2: Thursday 2 December 2021			
	9.30-11.00 hrs	Open GIS data sets	Dr. Shamita Kumar *BVIEER*
	11.00-11.30 hrs	**Tea break**	
	11.00-12.30 hrs	Open Remote Sensing data sets	Dr. Lakshmikanta Kumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs	Satellite sensors for mapping different ecosystem	Dr. Lakshmikanta Kumar *BVIEER*

Day 3: Friday 3 December 2021			
The Remote Sensing Process Hands on session on Terrain Analysis	9.00-9.30 hrs	Check in	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Geospatial data quality and accuracy	Dr. Shamita Kumar *BVIEER*
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Geospatial data quality and accuracy	Dr. Shamita Kumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Hands on assessing geospatial data quality and accuracy	Dr. Madhurima Dey BVIEER

Day 4: Saturday 4 December 2021				
Introduction to Indices Hands on session on using and interpreting indices	9.00-9.30 hrs	Recap		Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Introduction to Indices for SDG Goal 15: (NDVI, NDWI, EVI,NBR, SBI, Tassled Cap)		Dr. Lakshmikanta Kumar *BVIEER*
	10.30-11.00 hrs	**Tea break**		
	11.00-12.30 hrs	Introduction to Indices for SDG Goal 15: Index of coastal eutrophication and Index of Plastic Debris Density/ Mountain Green Cover Index		Dr. Lakshmikanta Kumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**		
	14.00-17.30 hrs With tea break at 16.00 hrs	Introduction to SAGA Hands on Session on interpretation ofsatellite images using indices		Dr. Lakshmikanta Kumar Dr. Madhurima Dey *BVIEER*

Sunday 5 December 2021				
		Holiday		

Day 5: Monday 6 December 2021				
Databases in GIS	9.00-9.30 hrs	Recap		Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Introduction to databases		Mr. Anand Shinde *BVIEER*
	10.30-11.00 hrs	**Tea break**		
	11.00-12.30 hrs	Preparing databases		Mr. Anand Shinde *BVIEER*
	12.30-14.00 hrs	**LUNCH**		
	14.00-17.30 hrs With tea break at 16.00 hrs	Hands on Session on databases, joiningtables, querying		Mr. Anand Shinde Dr. Madhurima Dey *BVIEER*

Day 6: Tuesday 7 December 2021				
	9.00-9.30 hrs	Recap		Dr. Kranti Yardi *BVIEER*

Digital Image Processing	9.30-10.30 hrs	Introduction to image analysis for SDG Goal 15: (Object based segmentation)	Dr. Lakshmi KantaKumar *BVIEER*
Hands on session on supervised classification	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Image classification and accuracy assessment	Dr. Lakshmi KantaKumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Introduction to SAGA Hands on Session on interpretation of satellite images using object based segmentation	Dr. Lakshmi KantaKumar Dr. Madhurima Dey *BVIEER*

Day 7: Wednesday 8 December 2021

Field Work	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Geosptial analysis for SDG 14: Introduction to Ocean Remote Sensing: Sensors	Dr. Lakshmi KantaKumar *BVIEER*
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Introduction to Ocean Remote Sensing: Principles	
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Hands of with Ocean Remote Sensing	Dr. Lakshmi KantaKumar *BVIEER*

Day 8: Thursday 9 December 2021

Habitat Suitability	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
iMAXENT	9.30-10.30 hrs	Introduction to Habitat Suitability Data sets for Habitat Suitability using a casestudy	Dr. Shamita Kumar *BVIEER*
	10.30-11.00 hrs	**Tea break**	

	11.00-12.30 hrs	Implementing Habitat Suitability in GIS using R	Dr. Shamita Kumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Introduction to MAXENT Interpreting MAXENT outputs	Dr. Shamita Kumar Dr. Lakshmi KantaKumar *BVIEER*

Day 9: Friday 10 December 2021			
MAXENT Modelling	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Hands on session on MAXENT modelling using python scripts	Dr. Lakshmi KantaKumar *BVIEER*
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Hands on session on MAXENT modelling using python scripts	Dr. Lakshmi KantaKumar Dr. Madhurima Dey *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Hands on session on MAXENT modelling using python scripts	Dr. Lakshmi KantaKumar Dr. Madhurima Dey *BVIEER*

Day 10: Saturday 11 December 2021			
Building corridors **Assessing fragmentation**	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Concepts of ecological corridors, measures of fragmentation	Dr. Shamita Kumar *BVIEER*
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Concepts, measures of fragmentation	Dr. Shamita Kumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Hands on Session: Assessing fragmentation using FRAGSTATS and interpreting the results. Using the results to monitor the SDGs	Dr. Lakshmi KantaKumar Mr. Anand Shinde *BVIEER*

Sunday 12 December 2021			
		Holiday	

Day 11: Monday 13 December 2021			
Wetlands **Google Earth Engine**	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Assessing wetlands	Dr. Shamita Kumar *BVIEER*
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Introduction to Google Earth Engine	Dr. Shamita Kumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Hands on Session: Google Earth Engine: using it for assessment of SDGs.	Dr. Lakshmi KantaKumar Dr. Madhurima Dey *BVIEER*

Day 12: Tuesday 14 December 2021			
Python for geospatial data analysis	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Use of Python in geospatial analysis	Dr. Lakshmi KantaKumar *BVIEER*
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Use of Python in geospatial analysis	Dr. Lakshmi KantaKumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Using GBIF data and GeoPandas to plot biodiversity trends	Dr. Lakshmi KantaKumar Dr. Madhurima Dey *BVIEER*

Day 13: Wednesday 15 December 2021			
Open Source Tools for social media data analysis	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	GIS-based land use suitability analysis using, PyLUSAT, an open-source Python toolkit	Dr. Lakshmi KantaKumar *BVIEER*
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Use of social media data for assessment	Dr. Lakshmi KantaKumar *BVIEER*
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Hands on Session: Analysis of social media data in Python	Dr. Lakshmi KantaKumar Dr. Madhurima Dey *BVIEER*

Day 14: Thursday 16 December 2021			
Working on Projects	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Working on projects in groups	
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Working on projects in groups	
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Working on projects in groups	BVIEER Team to assist

Day 15: Friday 17 December 2021			
Working on Projects	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Working on projects in groups	
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Working on projects in groups	
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Using GBIF data and GeoPandas to plot biodiversity trends	BVIEER Team to assist

Day 16: Saturday 18 December 2021			
Guest Lecture Working on projects	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Guest lecture	Dr. Manish Kale *Geomatics Group, CDAC*
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Guest lecture	Dr. Manish Kale *Geomatics Group, CDAC*
	12.30-14.00 hrs	**LUNCH**	
	14.00-14.00 hrs With tea break at 16.00 hrs	Guest lecture	*Dr. Arvind Jha, IFS (Retd PCCF)*
	16.00-16.30 hrs	Tea Break	
	16.30-18.00 hrs	Working on projects	BVIEER Team to assist

Day 17: Sunday 19 December 2021			
		Self organized project work	

Day 18: Monday 20 December 2021			
Working on Projects	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Guest lecture	
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Guest lecture	NRSC Group
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Working on projects in groups	BVIEER Team to assist

Day 19: Tuesday 21 December 2021			
Working on Projects	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Working on projects in groups	
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Working on projects in groups	
	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Working on projects in groups	BVIEER Team to assist

Day 20: Wednesday 22 December 2021			
Working on Projects	9.00-9.30 hrs	Recap	Dr. Kranti Yardi *BVIEER*
	9.30-10.30 hrs	Working on projects in groups	
	10.30-11.00 hrs	**Tea break**	
	11.00-12.30 hrs	Working on projects in groups	

	12.30-14.00 hrs	**LUNCH**	
	14.00-17.30 hrs With tea break at 16.00 hrs	Preparation of presentations	BVIEER Team to assist

Day 21: Thursday 23 December 2021			
	9.30-10.30 hrs	Online feedback	

	10.30-12.30 hrs	Presentations in groups	
	12.30-13.30 hrs	Valedictory Function	DST Representative