



Winter School in Geospatial Science and Technology (Level 1)

01 to 21 December, 2022

Organized by
Department of Geoinformatics,
University of Kashmir,
Jammu and Kashmir, India.

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

At
Department of
Geoinformatics,
University of Kashmir,
Jammu and Kashmir, India

Principal Investigator

Prof. Shakil Ahmad Romshoo, Professor, Department of
Geoinformatics, Kashmir University (KU),
Jammu & Kashmir, India

Co-Coordiators

1. Dr. Irfan Rashid, Coordinator Geoinformatics,
Department of Geoinformatics, Kashmir
University
2. Dr. Khalid Omar Murtaza, Assistant Professor,
Department of Geoinformatics, Kashmir
University

University of Kashmir

The University of Jammu and Kashmir was founded in the year 1948. In the year 1969 it was bifurcated into two full-fledged Universities: University of Kashmir at Srinagar and University of Jammu at Jammu. The University of Kashmir is situated at Hazratbal in Srinagar. It is flanked by the world famous Dal Lake on its eastern side and Nigeen Lake on the western side. The Main Campus of the University spread over 247 acres of land is divided into three parts – Hazratbal Campus, Naseem Bagh Campus and Mirza Bagh Campus (serving residential purpose). Additional land has been acquired at Zakura near the main campus for further expansion of the University. The tranquil ambience of the Campus provides the right kind of atmosphere for serious study and research. The University is committed to provide an intellectually stimulating environment for productive learning to enhance the educational, economic, scientific, business and cultural environment of the region. The University offers programmes in all the major faculties; Arts, Business & Management Studies, Education, Law, Applied Sciences & Technology, Biological Sciences, Physical & Material Sciences, Social Sciences, Medicine, Dentistry, Engineering, Oriental Learning and Music & Fine Arts. It has been constantly introducing innovative/ new programmes to cater to the needs and demands of the students and the society. Over the years, the University has marked towards excellence in its programmes and activities. It has been re-accredited as Grade-A+ University by the National Assessment & Accreditation Council (NAAC) of India. This is recognition and reflection of the high standard of quality in teaching and research at the University of Kashmir. Visit us on:-<https://www.kashmiruniversity.net>

Department of Geoinformatics

We are running interdisciplinary Ph.D./I.Ph.D program and professional M.Sc. course in Geoinformatics since 2010. The University started teaching Remote Sensing and GIS since 2004 with the introduction of the PGD in RS/GIS. The master's course is aimed to build the technical ingenuity of the student in the application of geospatial technologies for some of the most pressing real-world challenges in environmental, social and economic domains and also to match-up their skills to the growing demands in the industry for Geoinformatics. The Program emphasizes on theory, practical applications through hands-on exercises, case studies and an independent dissertation. The syllabus of the courses is as per the latest developments and trends in geospatial science and technology with specific geographic focus on the Jammu, Kashmir and Ladakh Himalayan region. A wide exposure and encouragement to the students and research scholars to be a part of rich knowledge exchange programs such as national and international seminars, workshops pertaining to the promotion of Remote Sensing, GIS, and GPS, have remained a key strength of the program over the years. The Department has more than a dozen active research collaborations with a few reputed national and international institutes/organization and have successfully conducted more than a score of sponsored research projects during the last one decade, with the total funding of more than INR 300 million in various fields of earth and environmental science. The Department has set up state of the art laboratories and field infrastructure in the field of Geoinformatics, glaciology, hydro-meteorology and climate change including the national ice-core laboratory for studying Himalayan ice cores. Visit us on:- <http://geoinformatics.uok.edu.in>



Fig 1. University of Kashmir ,Jammu and Kashmir, India

What is the Summer/Winter Schools (Level 1) 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 Summer/ Winter School in Geospatial technology is being conducted at two levels– Level 1 and Level 2. The 21-day summer/winter school in Geospatial Science and Technology (Level 1) supported by the National Geospatial Program (NGP) of the Department of Science and Technology, Government of India focuses on developing knowledge and capacity building in geospatial technologies through the use of open source geospatial software.

Who can apply?

Faculty members, scientist, technologist, researchers from academia, national institutes of research, smart city cells, municipal corporation and other government departments, personnel from non government organizations are eligible to apply. Only 2-3 seats at each centre are reserved for research scholars.

How to apply?

- Interested candidates should fill the online application form through the weblink available on <http://dst-iget.in>.
- Selected candidates will be informed by mail.
- For any further queries write to dst-iget@bviier.edu.in or call on +91-20-24375684/24362155.
- Address all queries to PI through Email.

Important Information

Last date for registration: 20 November 2022

Dates of the program: 01 to 21 December 2022

Mode of conduct: Offline mode

(According to the situation of Pandemic the mode of conducting the program will be changed to ONLINE)

Number of Seats: 25.

Registration Fees: Nil

Principal Investigator: Prof. Shakil Ahmad Romshoo, Professor,
Department of Geoinformatics, University of Kashmir, Jammu and Kashmir,
India.

Email: shakilrom@yahoo.com

Phone: Mob: +91-9419010924.

For any queries contact:

Prof. Shakil Ahmad Romshoo, (*Principal Investigator*), 91-9419010924

Address: Department of Geoinformatics, University of Kashmir, Hazratbal
Srinagar-190006, Jammu and Kashmir, India.

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: In case the program is conducted online due to COVID 19 restrictions, participants must ensure that they have a laptop and a strong internet connection.

Infrastructural facilities

The Department has set up state of the art laboratories and field infrastructure in the field of Geoinformatics, glaciology, hydro-meteorology and climate change including the national ice-core laboratory for studying Himalayan ice cores. That includes state of the art software such as PCI Geomatica, ERDAS Imagine, ArcGIS 10.2, IGIS Server; QGIS and ILWIS.

Boarding and Lodging facilities

The University has a spacious guest house known as Sheikh Hamza Makhdoom Guest House within the university campus at Srinagar with a total capacity of 45 double bedded rooms with AC/non-AC rooms and has a 24x7 wi-fi facility across the campus.

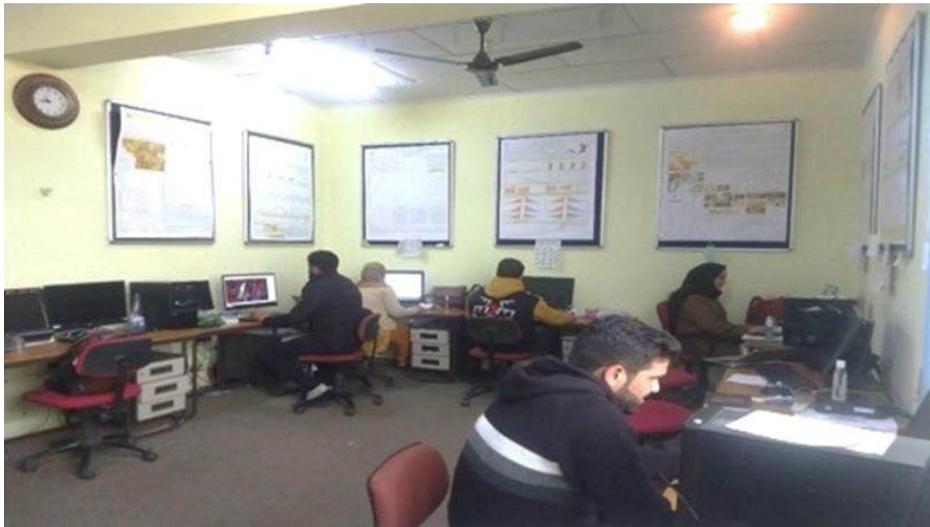


Fig 2,3,4 &5: Four Remote Sensing and GIS Labs at KU



Fig 6: Ground truth Survey Instrumentation in the Department



Fig 7: Sheikh Hamza Makhdoom Guest House

Program schedule for 21-Days Winter School Program in Geospatial Science and Technology (Level 1)

01 to 21 December 2022

Day & Date	Time	Topic	Resource Person
Day-1, 1 st Dec 2022	0900-0930 hrs	Registration	
	0930-1030 hrs	Inauguration (Video Presentation on UNGGIM Online Special Remarks)	Prof. Shakil A. Romshoo Dr. D. Dutta, DST, GOI Dr. Shamita Kumar, BVU
	1030-1100 hrs	TEA BREAK	
	1100-1200 hrs	1.1 Introduction of the group (trainers and trainees)	Prof. Shakil A. Romshoo
		Expectations from the training program Making groups for reporting, and grading of the course	Prof. Shakil A. Romshoo
	1200-1300 hrs	1.2 Geospatial Sciences: <ul style="list-style-type: none"> • What, why and how?? • Moving from data to information 	Prof. Shakil A. Romshoo
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	1.3 Introduction to data types in geospatial information (GI): <ul style="list-style-type: none"> • Overview of spatial and non-spatial data types (aerial photos, remote sensing, toposheets, databases, etc.). • Overview of data sources 	Invited Expert
	1600-1630 hrs	TEA BREAK	

	1630-1800 hrs	1.4 Exercise 1: Acquiring data (capture) (Downloading of ASTER, MODIS, Bhuvan, acquiring toposheets from SOI, ordering of IRS data, acquiring secondary data)	Dr. Sumaira Zaz
	1800-1815 hrs	1.5 Filling in feedback forms	KU TEAM
Day-2, 2nd Dec 2022	0900-0930 hrs	2.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative) – led by Coordinator	KU TEAM
	0930-1300 hrs	2.2 Understanding scales and projections a. Scales b. Projections c. (with tea break)	Invited Expert/ Dr. Muzamil Amin
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	2.3 Ex. Overview of QGIS (Use IGET_GIS_001)	KU Team
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	2.4 Ex. Working with projections using QGIS (use IGET_GIS_002) <ul style="list-style-type: none"> · Using existing projection · Making a new projection · Importing a projection 	Dr. Muzamil Amin
	1800-1815 hrs	2.5 Fill in feedback forms	KU TEAM
Day-3, 3rd Dec 2022	0900-0930 hrs	3.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative) led by Coordinator	KU TEAM

	0930-1100 hrs	3.2 Understanding data quality <ul style="list-style-type: none"> · Elements of data quality · Sources and types of errors in geospatial data building · Importance of metadata 	Invited Expert/ Dr. Irfan Rashid
	1100-1130 hrs	TEA BREAK	
	1130-1300 hrs	3.3 Extracting data - georeferencing and extraction of data	Dr. Irfan Rashid
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	3.4 Ex: Georeferencing (Use IGET_GIS_003)	Dr. Irfan Rashid and Dr. Sumaira Zaz
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	3.5 Ex: Extracting data (Use IGET_GIS_004)	Dr. Irfan Rashid and Dr. Sumaira Zaz
	1800-1830 hrs	3.6 Fill in feedback forms	KU TEAM
Day-4, 4th Dec 2022	0900-0930 hrs	4.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative) led by Coordinator	KU TEAM
	0930-1100 hrs	4.2 Understanding map making <ul style="list-style-type: none"> · Cartographic evolution · Map classification · Map elements · Principles of map design 	Invited Expert/ Dr. Muzamil Amin
	1000-1130 hrs	TEA BREAK	

	1130-1300 hrs	4.3 Group exercise on analysis of good and bad maps with reasons (to be based on map design principles) Group work and presentation	Dr. Muzamil Amin and Dr. Sumaira Zaz
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	4.4 Ex: Map preparation (Use IGET_GIS_006)	Dr. Muzamil Amin
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	Continue with ex. (IGET_GIS_006)	Dr. Muzamil Amin
	1800-1815 hrs	Fill in Feedback Forms	KU TEAM
Day-5, 5th Dec 2022	0900-0930 hrs	5.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)- led by coordinator	KU TEAM
	0930-1300 hrs With tea break	5.2 Understanding attribute data <ul style="list-style-type: none"> · Importance of database · Database management systems · Building attribute data 	Dr. Irfan Rashid
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	5.3 Ex: Data exploration (Use IGET_GIS_007)	Dr. Sumaira Zaz
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	5.4 Ex: Working with tables (use IGET_GIS_008)	Dr. Sumaira Zaz
	1800-1815 hrs	5.5 Fill in Feedback Forms	KU TEAM

Day-6, 6th Dec 2022	0900-0930 hrs	6.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative) – led by coordinator	KU TEAM
	0930-1300 hrs (with tea break)	6.2 Visualizing data through queries	Dr. Sumaira Zaz
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	6.3 Ex: Working with queries (use IGET_GIS_009)	Dr. Sumaira Zaz and Muzamil
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	6.4 Ex: Working with queries (IGET_GIS_010)	Dr. Sumaira Zaz and Muzamil
	1800-18.15 hrs	6.5 Feedback	
Day-7, 7th Dec 2022	0900-0930 hrs	7.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1100 hrs	7.2 Introduction to GPS	Dr. Irfan Rashid
	1100-1130 hrs	TEA BREAK	
	1130-1300 hrs	7.3 Ex: Field exercise for collecting points using GPS	Dr. Irfan Rashid
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	7.4 Ex : Importing GPS data into QGIS (Use IGET_GIS_011)	Dr. Irfan Rashid
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	7.5 Ex: Using Google Earth / Bhuvan (Use IGET_GIS_012)	Dr. Irfan Rashid
	1800-1815 hrs	Fill in Feedback Forms	KU TEAM
Day-8, 8th Dec 2022	0900-0930 hrs	8.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1100 hrs	8.2: Types of remote sensing	Invited Speaker/Dr. Khalid Omar

	1100-1130 hrs	TEA BREAK	
	1130-1300 hrs	8.3 Applications of remote sensing	Prof. Shakil Ahmad Romshoo
	1300-1400 hrs	LUNCH	
	1400-1800 hrs With tea break	8.4 Ex: Intro to SAGA (Use IGET_RS_001)	KU Team
	1800-1815 hrs	8.5 Fill in Feedback Forms	KU TEAM
Day-9, 9th Dec 2022	0900-0930 hrs	9.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1100 hrs	9.2 Understanding the image – elements of visual interpretation	Invited Expert/ Dr. Khalid Omar
	1100-1130 hrs	TEA BREAK	
	1130-1300 hrs	9.3 Understanding the image -understanding image statistics	Dr. Khalid Omar
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	1. Ex: Image interpretation (Use IGET_RS_002) 2. Ex: Understanding the image (histogram) (Use IGET_RS_003)	Dr. Khalid Omar
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	9.6 Role of Geospatial technology in measuring SDGs using various indicators	Prof. Shakil Ahmad Romshoo
	1800-1815 hrs	9.7 Fill in Feedback	KU TEAM
Day-10, 10th Dec 2022	0900-0930 hrs	10.1 Feedback (analysis by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1100 hrs	10.2 Geometric correction	Dr. Khalid Omar
	1100-1130 hrs	TEA BREAK	
	1130-1300 hrs	10.3 Atmospheric and Radiometric corrections	Dr. Khalid Omar

	1300-1400 hrs	LUNCH	
	1400-1800 hrs With tea break	10.4 Ex: Image registration (use IGET_RS_0004)	Dr. Khalid Omar
	1800-1815 hrs	Fill in the Feedback Form	KU TEAM
Day-11, 11th Dec 2022	0900-0930 hrs	11.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1300 hrs With tea break	11.2 : Introduction to image enhancements <ul style="list-style-type: none"> · Contrast enhancements, . Principal Components Analysis · Band rationing, . Spatial filtering · Vegetation Indices 	Prof. Shakil Romshoo and Dr. Khalid Omar
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	11.3 Ex: Working with images – subsetting and mosaicking (Use IGET_RS_005)	Dr. Khalid Omar
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	11.4 Ex: Using enhancements (use IGET_RS_006)	Dr. Khalid Omar
	1800-1815 hrs	Fill in Feedback Forms	KU TEAM
Day-12, 12th Dec 2022	0900-0930 hrs	12.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1100 hrs	12.2 Introduction to image classification: Unsupervised	Invited Speaker/Dr. Khalid Omar
	1100-1130 hrs	TEA BREAK	
	1130-1300 hrs	12.3 Introduction to image classification: Supervised	Dr. Khalid Omar
	1300-1400 hrs	LUNCH	
	1400-1800 hrs With tea break	12.4 Ex: Extracting information for satellite image using unsupervised classification (Use IGET_RS_007)	Dr. Khalid Omar

	1800-1815 hrs	12.5 Fill in Feedback Forms	KU TEAM
Day-13, 13th Dec 2022	0900-0930 hrs	13.1 Feedback (analysis by participants and presented – quantitative & qualitative)	KU TEAM
	0930-1100 hrs	13.2 Accuracy assessment: why and how	Prof. Shakil Romshoo
	1100-1130 hrs	TEA BREAK	
	1130-1600 hrs With lunch break	1. Ex: Extracting information from satellite image using supervised classification (Use IGET_RS_008) 1. Ex: Accuracy assessment (Use IGET_RS_009)	Dr. Khalid Omar
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	SDI framework and role of Geospatial science and technology	Prof. Shakil Ahmad Romshoo
	6.00-6.15	13.5 Fill in Feedback forms	KU TEAM
Day-14, 14th Dec 2022	0900-0930 hrs	14.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1100 hrs	14.2 Change detection	Dr. Irfan Rashid
	1100-1130 hrs	TEA BREAK	
	1130-1300 hrs	14.3 Understanding terrain data	Dr. Irfan Rashid
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	14.4 Ex: Terrain analysis (Use IGET_RS_010)	Dr. Irfan Rashid
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	14.5 Ex: Change detection with SAGA (use IGET_RS_011)	-----
1800-1815 hrs	14.6 Fill in Feedback forms		
Day-15, 15th Dec 2022	0900-0930 hrs	15.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM

	0930-1300 hrs With tea break	15.2 Spatial data analysis	Invited Expert/ Dr. Sumaira Zaz
	1300-1400 hrs	LUNCH	
	1400-1800 hrs With tea break	15.3 Exercise on spatial data analysis (Use IGET_SA_001)	Dr. Sumaira Zaz
	1800-1815 hrs	15.4 Feedback	KU TEAM
Day-16, 16th Dec 2022	0900-0930 hrs	16.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1100 hrs	16.2 Introduction to PostGRE/PostGIS and demos	Dr. Irfan Rashid
	1100-1130 hrs	TEA BREAK	
	1130-1300 hrs	16.3 Understanding Geoserver –Open layer, web services and demos	Dr. Irfan Rashid
	1300-1400 hrs	LUNCH	
	1400-1600 hrs	16.4 Catalogue Services -Geonetwork	Dr. Irfan Rashid
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	16.5 Exercise Using PostGRE/PostGIS (use IGET__)	Dr. Irfan Rashid
	1800-1815 hrs	16.6 Feedback	KU TEAM
	Day-17, 17th Dec 2022	0900-0930 hrs	17.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)
0930-1100 hrs		17.2 Applications on RS/GIS in planning (urban/rural) with specific case studies highlighting detailed methodology	Invited Expert
1100-1130 hrs		TEA BREAK	
1130-1300 hrs		17.3 Applications of RS/GIS in natural resource management (forest, wildlife/agriculture/watershed)	Invited Expert

	1300-1400 hrs	LUNCH	
	1400-1600 hrs	17.4 Applications of RS/GIS in climate studies with specific case studies highlighting detailed methodology	Invited Expert
	1600-1630 hrs	TEA BREAK	
	1630-1800 hrs	17.5 Group exercise: Participants to make a methodology flow chart for given applications	Dr. Khalid Omar
	1800-1815 hrs	17.6 Feedback	KU TEAM
Day-18, 18th Dec 2022	0900-0930 hrs	18.1 Feedback (analysis to be done by participants and presented – quantitative and qualitative)	KU TEAM
	0930-1300 With tea break	18.2 Discussion of possible minor projects to be done by the participants. Institutions to give projects according to data available with them or using data that can be generated easily.	Prof. Shakil Romshoo, Dr. Irfan Rashid, Dr. Sumaira, Dr. Khalid Omar and Dr. Muzamil Amin
	1300-1400 hrs	LUNCH	
	1400-1800 hrs With tea break	18.3 Working on projects	Dr. Sumaira, Dr. Khalid Omar and Dr. Muzamil Amin
	1800-1815 hrs	18.4 Filling in feedback forms	KU TEAM
Day-19, 19th Dec 2022	09.00-18.00 hrs	Working on projects	Dr. Sumaira, Dr. Khalid Omar and Dr. Muzamil Amin
Day-20, 19th Dec 2022	09.00-18.00 hrs	Working on projects	Dr. Sumaira, Dr. Khalid Omar and Dr. Muzamil Amin

Day-21, 21st Dec 2022	0900-1300 hrs	Final project presentation by participants (GroupWise) including tea break	Prof. Shakil Romshoo, Dr. Irfan Rashid, Dr. Sumaira, Dr. Khalid Omar and Dr. Muzamil Amin
	1300-1400 hrs	LUNCH	
	1400-1530 hrs	Feedback and Valedictory	Prof. Shakil Romshoo





3-Week Capacity Building Program in Glaciology

4th-23rd September, 2023



Organised
by
University of Kashmir
Srinagar, India



Sponsored by



Department of Science and
Technology DST, GoI
Under Climate Change Program

About the Capacity Building Program

We recognize the paramount importance of glaciers in the Himalayas, which not only provide freshwater for drinking, agriculture, and hydropower generation but also contribute significantly to the ecological balance of the region. As the effects of climate change continue to unfold, it is crucial to build the capacity of Indian researchers so that they are able to undertake interdisciplinary glaciological research endeavors to understand the dynamics of glaciers and their response to climate change. By studying glacier mass balance, glacier dynamics in term of glacier velocity, thickness, and equilibrium line altitude, we can unravel the complex interactions between glaciers and the changing climate. Furthermore, we need to investigate the implications of glacier melt on various resources and economic sectors in the Indian Himalaya. Capacity building has therefore become a prerequisite to foster extensive research on glaciers and facilitate adaptation strategies to address these issues.

In recognition of the above, the University of Kashmir under the aegis of the Centre of Excellence for Glacial Studies in the Western Himalaya are conducting a 3-week capacity building program with the support of the Department of Science and Technology, Govt. of India. Through the capacity building program, we intend to build the capacity of the school participants in theoretical aspects of glaciology, cutting-edge research methodologies, use of the state-of-the-art facilities and instruments, glacier field training, involving a high-class expertise and well-trained team of field glaciologists. It is hoped that the capacity building program shall help the school participants to unravel the complexities of glaciology, glacial-hydrology and climate change influences.

The capacity building program aims at enhancing the human and institutional capacities of Indian students and researchers on various aspects of glaciology and allied fields and shall equip them with necessary knowledge and skills to carry out their research independently. The program is starting in September 2023 and shall continue for three years (2023-26).

Course Eligibility

The capacity building program is open to physically and psychologically sound graduate students throughout India targeting primarily early stage PhD students researching cryosphere and related fields. Students must be enrolled in a PhD during the time of the capacity building program. Women participants are particularly encouraged to apply for the school and shall be given preference, if, otherwise eligible. However, first-year postdocs/early-career scientists and bright Master's students may also be considered in exceptional cases, if a strong case can be made about why this course is useful to the applicant. Prior knowledge/background in glaciology and allied fields is a prerequisite. Participants need to submit a commendation letter from the Head/Director of their institution along with the application form. 2nd AC train travel and hostel accommodation shall be provided to all the School participants.



Important Dates

- Online registration : 10 July, 2023
- Last date of registration : 10 Aug, 2023
- Selection List : 15 August, 2023
- Course starting : 01 September, 2023
- Registration Link: [Click here](#)

<https://forms.gle/MntAi588JhcPAAfZ7>

Resource persons/Course Instructors

Leading experts in the field of glaciology, glacio-geomorphology, glacier-hydrology, climate change and allied fields from various institutes of national and international repute will act as resource person for lecturing on theoretical and field aspects of glaciology and allied fields. Furthermore, well-trained glacier scientists and field glaciologists will be engaged as course instructors for practical and fieldwork to equip the participants with the necessary field knowledge to build their capacity in various aspects of field glaciology and instrumentation use.

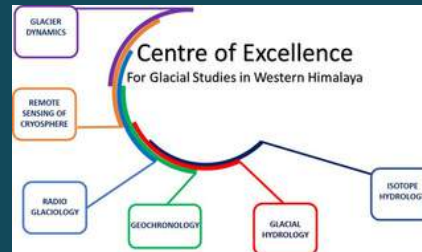


Date	Day	Activity
03-Sept.	0	Arrival at Srinagar, Kashmir and Guest House check-in. Free evening
04-Sept.	1	Inauguration and overview of the Glacier Capacity Building program Fundamentals of Glaciology and introduction to important related fields Glacier monitoring and assessment approaches Remote sensing of cryosphere; inventory and glacier parameter retrieval
05-Sept.	2	Glacier mass balance approaches Glacier thickness and volume estimation Glacier modelling Advanced instrumentation for glacier studies
06-Sept.	3	Paleo-glaciation in the Himalaya Glaciers under changing Climate Climate Models: Scenarios, downscaling, and projections Aerosol-glacier interactions
07-Sept.	4	Glacier dynamics: ice velocity and surging Glacier geomorphology and glacier terrain mapping LGM, dating and paleo-glacier reconstructions
08-Sept.	5	Glacier hydrology: Snow melt runoff modeling, Isotope hydrology and tracers Glacier Hazards: GLOFs Mini Project (2-3 students): Group and topic assignment
09-10, Sept.	6 & 7	Holiday
11-13 Sept. 13-Sept (AN)	8 to 10	Mini Project (2-3 students) Glacier Fieldwork orientation, safety considerations, logistics and instrumentation
14-Sept (FN) 14-22 Sept.	11 to 19	Departure to Ladakh for fieldwork at the Machoi glacier Field training at the glacier site
22-Sept (AB) 23-Sept.	20	Departure to KU, Srinagar Student project presentation & Valedictory Function
24-Sept.	21	Departure of the School participants to respective destinations



The Centre of Excellence for Glacial Studies in the western Himalaya is an inter disciplinary research effort involving researchers cutting across various domains of Cryosphere, Hydrology and Climate change established at the University of Kashmir with partnership from the relevant institutes within and outside the region. The initiative was launched with the support of the Department of Science and Technology (DST), Govt. of India as part of the National Mission for Sustaining the Himalayan Ecosystem (NMSHE) in March, 2020. The Himalayan region is highly prone to the climate change due to its ecological fragility, biophysical setting and geographic location. The vast snow and glacier resources, trans-boundary river basins, and inherent socio-economic instabilities are some of the factors that make it important to study the climate change impacts in the Himalaya. The concern over the depletion of the cryosphere in the Himalayan region has attracted the attention of the scientists, decision makers, and policymakers to understand the dynamics and driving factors of Himalayan cryosphere. In order to provide a flip to the glaciological research activities, it was therefore thought necessary to establish a Centre for Excellence (CoE) for Glacial Studies at the University of Kashmir.

CoE thrust research areas



CoE research team

- Prof. Shakil A. Romshoo PI
- Dr. Reyaz A. Dar Co-PI
- Dr. Sarah Qazi Co-PI
- Dr. Khalid Omar Co-PI
- Principal Project Associate 1
- Senior Project Associate 3
- Project Associate - II 3
- Project Associate - I 4
- Sc/Lab/Tech Assistant 3
- Field Worker 2
- Total Technical Staff 21



Lab/Field Instrumentation

The CoE has state-of-art Lab. and field instrumentation including:

- Unmanned aerial vehicle
- Terrestrial laser scanner
- Total organic carbon analyser
- Spectro-Radiometer
- Isotope analyser
- Steam driven ice drill
- Ice radar
- Ice core drill
- Aethalometer
- Ice-core Laboratory



ToC Analyser



Spectro-radiometer



Terrestrial laser scanner



Ice-core Laboratory



Isotope Analyser



Heuckes Drill



Ice core drill



Unmanned Aerial Vehicle



Ice core freezer



Ice Radar



GPR profiling

Glacier field work



Machoi Glacier

Machoi glacier located in the Ladakh region has been chosen for imparting field training on various aspects of glaciology and instrumentation use to the school participants. The glacier is about 6 Sq. km in area and is situated in the Drass sub-basin, about 26 km from Sonamarg, the major tourist attraction in the Kashmir valley. The Drass River originating from the melt-waters of the Machoi Glacier joins the Suru River at the Kargil town. The Glacier, facing north, has a mean altitude of ~4600 m asl and the slope ranges from 1° – 60° with a mean value of 21°. The glacier is being monitored by the University of Kashmir since 2013 for various aspects including length and area changes, mass balance, ice thickness using state-of-art instrumentation and earth observation data.



Ice core drilling at Machoi

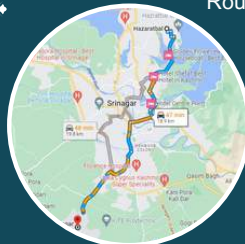
University Guest House in the main campus University of Kashmir which is situated at Hazratbal, Srinagar. It is flanked by the world famous Dal Lake on its eastern side and Nigeen Lake on the western side. The Main Campus of the University spread over 247 acres of land is divided into three parts – Hazratbal Campus, Naseem Bagh Campus and Mirza Bagh Campus (serving residential purpose). The tranquil ambience of the Campus provides the right kind of atmosphere for serious study and research. The participants in the program will be accommodated in Guest house during the theoretical part of the program. However, during field work at the Machoi glacier, the participants will be accommodated on sharing-basis in nearby hotels in Drass for a few days and also in the tents pitched at the base camp of the Machoi glacier or in the vicinity.



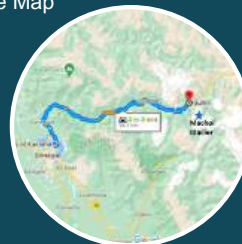
KU, Guest House



Machoi Base Camp



Airport-TRC to KU



KU to Machoi Glacier

Accommodation



Contact Us

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GOVERNMENT OF INDIA
Ministry of Science & Technology
Department of Science & Technology
DST/CCP/NMSHE/Glaciology/215/2023 (C)
(Climate Change Programme)

Technology Bhawan, New Delhi

Dated: 28/03/2023

Sanction Order

Subject: Financial assistance for the project entitled "Capacity Building Program in Glaciology" submitted by Prof. Shakil Ahmad Romshoo, UNIVERSITY OF KASHMIR SRINAGAR, SRINAGAR, SRINAGAR, JAMMU AND KASHMIR, 190006. Release of the First installment regarding

Sanction of the President is hereby accorded to the approval to the above mention project at a total cost of Rs. 1,19,81,104/- (Rupees One Crore Nineteen Lakh Eighty One Thousand One Hundred Four only) for the duration of 3 Years . The detailed breakup of the grant for general as well as capital components are given below: -

General Component : ₹ 1,00,81,104

Capital Component : ₹ 19,00,000

Sl.No.	Name of the Equipment	Qty.	Non-Recurring Head (in Rs.)			
			1 Year	2 Year	3 Year	Total
1	Field/mountaineering gear-@Rs. 1200000/-	1	1200000	0	0	1200000
2	Long Endurance UAV battery-@Rs. 100000/-	2	200000	0	0	200000
3	Thermistors for measurement of glacier debris thermal properties-@Rs. 500000/-	1	500000	0	0	500000
Total			1900000	0	0	1900000

2. The sanction of the President is also accorded to the release of Rs. 19,00,000/- (Rupees Nineteen Lakh only) to the "Director/Registrar/Principal/Controller/Comptroller, UNIVERSITY OF KASHMIR SRINAGAR" being the First installment of grant as mentioned above table under "Capital Component" for the above mentioned project.

3. The expenditure involved is debitable to Demand No. 89 , Department of Science & Technology for the year 2022-23:

3425	Other Scientific Research(Major Head)
3425.60	Others : (Sub-Major Head)
3425.60.200	Assistance to Other Scientific Bodies(Minor Head)

Handwritten notes:
New Delhi
By 10/6
Capacity building
Glaciology

3425.60.200.71	Research & Development
3425.60.200.71.03	Other Programmes
3425.60.200.71.03.35	Grants for creation of capital assets
	(Previous: 3425.60.200.56.04.35)

4. The amount of Rs. 19,00,000/- (Rupees Nineteen Lakh only) will be drawn by DDO, DST and disbursed to the "CNA account of Autonomous body SERB in respect of Research and Development Scheme".

Name of A/C Holder	Research And Development SERB
Bank A/C No	60418655210
Name of the Bank & branch	Bank of Maharashtra, Press Enclave - New Delhi
RTGS/IFSC code	MAHB0000593

5. The amount of Rs. 19,00,000/- (Rupees Nineteen Lakh only) will be drawn by the "CNA account of Autonomous body SERB and will be disbursed to the Director/Registrar/Principal/Controller/Comptroller, UNIVERSITY OF KASHMIR SRINAGAR".

The bank details for electronic transfer of funds through RTGS are given below: -

Name of A/C Holder	UNIVERSITY OF KASHMIR
Bank A/C No	60428533764
Name of the Bank & branch	Bank of Maharashtra
RTGS/IFSC code	MAHB0001304

6. As per Rule 234 of GFR 2017, the sanction has been entered at S. No 45 . in the register of grants maintained in the Climate Change Programme for the scheme National Summer School in Glaciology.

7. This issues with the concurrence of IFD Vide their Concurring Dy. No IFD/C/II/280323/35/04415 dated 28/03/2023.

8. The GI will keep all the funds received in the Central Nodal Account only and shall not transfer the funds to any other account or not divert the same to Fixed Deposits/ Flexi-Account/ Multi-Option Deposit Account/ Corporate Liquid Term Deposit (CLTD) account etc. The funds released to GI shall not be parked in bank account of any other agency.

9. The GI will ensure the compliance of OM. No. F. No. 1/(18)/PFMS/FCD/2021 dated March 9, 2022 of Department of Expenditure, Ministry of Finance.



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Technology Bhawan, New Delhi

Dated: 28/03/2023

Sanction Order

Subject: Financial assistance for the project entitled "Capacity Building Program in Glaciology" submitted by Prof. Shakil Ahmad Romshoo, UNIVERSITY OF KASHMIR SRINAGAR, SRINAGAR, SRINAGAR, JAMMU AND KASHMIR, 190006 Release of the First installment regarding

Sanction of the President is hereby accorded to the approval to the above mention project at a total cost of Rs. 1,19,81,104/- (Rupees One Crore Nineteen Lakh Eighty One Thousand One Hundred Four only) for a duration of 3 Years . The detailed breakup of the grant for General as well as Capital Components are given below:-

General Component : ₹ 1,00,81,104/-

Capital Component : ₹ 19,00,000/-

Items	Budget Summary (in Rs.)			
	Year-1	Year-2	Year-3	Total
1- Non-Recurring				
Field mountaineering gear-@Rs. 1200000/- - 1	1200000	0	0	1200000
Long Endurance UAV battery- @Rs. 100000/- - 2	200000	0	0	200000
Thermistors for measurement of glacier debris thermal properties- @Rs. 500000/- - 1	500000	0	0	500000
Subtotal (Capital)	1900000	0	0	1900000
2- Recurring				
Project Staff	254880	254880	254880	764640
Scientific Administrative Assistance/Field Worker-I (@ Rs. 18000/Month +18% HRA)	254880	254880	254880	764640
Consumables	200000	200000	200000	600000
Contingency	300000	300000	300000	900000
Travel	2000000	2000000	2000000	6000000
Overhead	305488	305488	305488	916464

Other Cost-Field work and Maintenance of the field equipment	300000	300000	300000	900000
Subtotal (General)	3360368	3360368	3360368	10081104
Total Project Cost (Cap.+ Gen.)	5260368	3360368	3360368	11981104

2. The sanction of the President is also accorded to the release of Rs. 33,60,368/- (Rupees Thirty Three Lakh Sixty Thousand Three Hundred Sixty Eight only) to the "Director/Registrar/Principal/Controller/Comptroller, UNIVERSITY OF KASHMIR SRINAGAR" being the First installment of grant as mentioned above table under "General Component" for the above mentioned project.

3. The expenditure involved is debitable to Demand No. 89, Department of Science & Technology for the year 2022-23:

3425	Other Scientific Research(Major Head)
3425.60	Others : (Sub-Major Head)
3425.60.200	Assistance to Other Scientific Bodies(Minor Head)
3425.60.200.71	Research & Development
3425.60.200.71.03	Other Programmes
3425.60.200.71.03.31	Grants-in-aid General
	(Previous: 3425.60.200.56.04.31)

4. The amount of Rs. 33,60,368/- (Rupees Thirty Three Lakh Sixty Thousand Three Hundred Sixty Eight only) will be drawn by DDO, DST and disbursed to the "CNA account of Autonomous body SERB in respect of Research and Development Scheme".

Name of A/C Holder	Research And Development SERB
Bank A/C No	60418655210
Name of the Bank & branch	Bank of Maharashtra, Press Enclave - New Delhi
RTGS/IFSC code	MAHB0000593

5. The amount of Rs. 33,60,368/- (Rupees Thirty Three Lakh Sixty Thousand Three Hundred Sixty Eight only) will be drawn by the "CNA account of Autonomous body SERB and will be disbursed to the Director/Registrar/Principal/Controller/Comptroller, UNIVERSITY OF KASHMIR SRINAGAR". The bank details for electronic transfer of funds through RTGS are given below:-

Name of A/C Holder	UNIVERSITY OF KASHMIR
Bank A/C No	60428533764
Name of the Bank & branch	Bank of Maharashtra
RTGS/IFSC code	MAHB0001304

6. As per Rule 234 of GFR 2017, the sanction has been entered at S. No 44 . in the register of grants maintained in the Climate Change Programme for the scheme National Summer School in Glaciology .



GOVERNMENT OF INDIA
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Sanction Order

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Sanction of the President is hereby accorded to the approval to the above mention project at a total cost of Rs. 1,19,81,104/- (Rupees One Crore Nineteen Lakh Eighty One Thousand One Hundred Four only) for the duration of 3 Years . The detailed breakup of the grant for general as well as capital components are given below: -

General Component : ₹ 1,00,81,104
Capital Component : ₹ 19,00,000

			Non-Recurring Head (in Rs.)			
Sl.No.	Name of the Equipment	Qty.	1 Year	2 Year	3 Year	Total
1	Field/mountaineering gear-@Rs. 1200000/-	1	1200000	0	0	1200000
2	Long Endurance UAV battery-@Rs. 100000/-	2	200000	0	0	200000
3	Thermistors for measurement of glacier debris thermal properties-@Rs. 500000/-	1	500000	0	0	500000
Total			1900000	0	0	1900000

2. The sanction of the President is also accorded to the release of Rs. 19,00,000/- (Rupees Nineteen Lakh only) to the "Director/Registrar/Principal/Controller/Comptroller, UNIVERSITY OF KASHMIR SRINAGAR" being the First installment of grant as mentioned above table under "Capital Component" for the above mentioned project.

3. The expenditure involved is debitable to Demand No. 89 . Department of Science & Technology for the year 2022-23:

3425	Other Scientific Research(Major Head)
3425.60	Others : (Sub-Major Head)
3425.60.200	Assistance to Other Scientific Bodies(Minor Head)



