



Summer School In Geospatial Science and Technology (Level 2)

Mountain Disaster Management- (Landslide)

2 to 22nd June 2022

At

Geoinformatics and Building Technology Research Centre

Department of Civil Engineering

Chitkara University, Solan, Himachal Pradesh, India

Organized by

Geoinformatics and Building Technology
Research Centre, Department of Civil
Engineering, Chitkara University, Solan,
Himachal Pradesh, India

Supported by

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

Principal Investigator

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Co-Principal Investigator

Dr Varinder Singh Kanwar, Vice-Chancellor and Professor,
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Chitkara University, Himachal Pradesh

Chitkara Educational Trust, established in the year 1998, has been set up with a clear mission to pursue excellence in the field of education and adhere to the highest standards of academic rigor in all its work. Since then, Chitkara has grown tremendously and has attained a leadership position in North India which speaks volumes about its enduring commitment, outstanding faculty, and a rich learning environment.

In October 2007, Government of Himachal Pradesh issued a Letter of Intent to the Chitkara Educational Trust for the establishment of Chitkara University. The Legislature of Himachal Pradesh passed Chitkara University (Establishment and Regulation) Act, 2008 (Act No. 2 of 2009) that was notified in the Himachal Pradesh Gazette on January 28, 2009.

Chitkara University, Himachal Pradesh is a NAAC accredited State Private University established in the state of Himachal Pradesh and has the right to confer degrees as per the Sections 2(f) and 22(1) of the UGC Act, 1956. It has been established and managed by passionate academicians with the sole mission of making each student “Industry-ready”. Our Founders Dr. Ashok K' Chitkara and Dr. Madhu Chitkara have been passionate teachers for more than four decades.

It has stood indomitable and audacious throughout the years and proved itself in every aspect, with a vision of enlightening its students to think out of the box and push their boundaries in the field of education. Chitkara University is a brand in the academic sector and is known for its commitment, quality of education and comprehensive research in multiple sectors. The University offers under graduate, post graduate and Doctoral level programmes in engineering & sciences. Visit us on: <https://www.chitkarauniversity.edu.in/>

Civil Engineering & Geoinformatics and Building Technology Research Centre (GBTRC)

The GBTRC within the department of Civil Engineering is a Research Centre under the aegis of CURIN. The key mission of the GBTRC is to conduct applied research in Geo-Informatics, Civil and Environmental Engineering. The major goal is to use the latest tools and technologies to produce innovative designs that can benefit our way of work. In this perspective, research in advance engineering and technology, such as the use of Geographical Information System (GIS) and Remote Sensing know-how, Water Resources Research, Building Technology and new Building Material Research in particular is of utmost importance.

The centre provides an opportunity to pursue exploratory projects in diverse areas of engineering and brings together a team of dedicated researchers who push the limits to achieve the goal. At present, GBTRC has the various facilities such as Arc View Lab kit version 10.2 (31 User Pack), STAAD Pro, Microstation + MX Road + Water GEMS + Sewer GEMS and QGIS, SAGA GIS, ILWIS, GEO5, GeoSlope, Total Station, GPS, Mirror Stereoscope along with Parallax Bar, Direct Shear apparatus, Triaxial Shear apparatus, Vane Shear apparatus, UTM, CTM and HP -A0 Size Scanner cum Printer. These software and instruments are used by students, research scholars and faculty members. Visit us on: <https://www.chitkarauniversity.edu.in/curin/gbtrc/>



Fig 1. Chitkara University, Himachal Pradesh

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 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 Chitkara University, Himachal Pradesh: Mountain Disaster Management (Landslide)

Summer School (Level 2 - Advanced) on "**MOUNTAIN DISASTER MANAGEMENT (LANDSLIDE)**" focuses on include theory sessions, guest lectures, field sessions as well as lab sessions besides assignments and completing a mini-project.

1. Introduction to theoretical, practical, and field aspects of Geological, Geotechnical, and Geospatial technologies for preparation Vulnerable, Risk Assessment and Management maps at the
2. The course intends to impart training mainly to the faculty members of colleges/ universities; scientists from various organizations, state/ central government officials, Disaster management planners, and Research Scholars.
3. Field visits will be conducted in high-altitude Himalayan regions for two to three days around the Shimla region. The participants will be given hands experience in field procedures for data collection and interpretation.

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 (2021–2023)
- For any further queries write to dst-iget@bviier.edu.in or call on +91-20-24375684/24362155.
- Address all queries regarding the program to the PI through email (cprakasam@gmail.com) / Mobile No: 8628800475.

Important Information

Last date for registration : 5 May 2022

Dates of the program: 2 to 22nd June 2022

Mode of conduct: Offline mode only, (But based on the COVID 19 situation it will be finalized 2 months before commencement of the summer school)

No. of seats: 25

Registration Fees: Nil

Principal Investigator: Dr C. Prakasam, Associate Professor & Head (i/c), Department of Geography, School of Earth Sciences, Assam University, (A Central University), Diphu, Assam

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- **Dr Varinder Singh Kanwar (Co-Principal Investigator)**, varinderkanwar@gmail.com, 01795 661001

Address: Geo-informatics and Building Technology Research Centre, Department of Civil Engineering, Chitkara University, Solan, Himachal Pradesh 174103

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 (100% is mandatory for all the participants).

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.

Infrastructure and Facilities

Twenty faculty members are working in different fields of civil engineering; especially five faculty members are working dedicatedly in the field of Geoinformatics. There are ten well established labs in civil engineering department. There are well-established three kitchens for veg and non-veg food items. Fully Wi-Fi campus (24*7). All time transport facility is available for participants (University Car / Bus / Winger).

Lodging Facilities

The University has, its own guest house with both AC and Non-AC rooms. The numbers of the rooms are sufficient to accommodate 100 participants and resource persons at a time. (We can accommodate all the participants in our university campus).



Fig 2. Aerial view of the university campus



Fig 3 & 4. Geoinformatics Lab



Fig 5 & 6. Geotechnical Engineering Lab



Fig 7. Survey Equipment



Fig 8. Lecture Room



Fig 9. Lecture Room



Fig 10. Conference Hall



Fig 11. Guest House



Fig 12 & 13. Boarding and Lodging Facilities

Program schedule for 21 Days Winter School in Geospatial Science and Technology

(Level 2)

(2nd to 22nd June 2022)

MOUNTAIN DISASTER MANAGEMENT-(LANDSLIDE)

A. One Week Self Study Module

Day	Date	Theory and hands on
1	23.05.2022 Monday	Group Introduction, Discussion on expectations from the training program; Introduction to self study tutorials
2	24.05.2022 Tuesday	Basics of remote sensing; Hands on exercise as self study (SAGA exercises)
3	25.05.2022 Wednesday	Basics of GIS; Hands on exercise as self study (QGIS Exercises)
4	26.05.2022 Thursday	Basics of geological and geotechnical investigation and methods
5	27.05.2022 Friday	Introduction of landslide disaster management
6	28.05.2022 Saturday	Basics Slope stability

B. Three Weeks Schedule

DAY	DATE	FORENOON (LECTURE SESSION)			AFTERNOON (LAB SESSION)			
		09.00 AM – 11.00 AM	TEA BREAK (11.00 TO 11.15 AM)	11.15AM – 01.00 PM	LUNCH BREAK (1.00 TO 2.00 PM)	02.00PM – 3.30 PM	TEA BREAK (3.30 TO 3.45 PM)	3.45 – 6.00 PM
1	02-06-2022 Thursday	Inauguration				Basics of Surveying		
2	03-06-2022 Friday	Introduction to Remote Sensing, Sensors, Image Analysis, Applications.		Introduction, Types of data, Data base concept, Date processing methods, Projection & Datum, Cartography and map making techniques.		Introduction to Survey instruments (familiarization) Levelling		Introduction to Survey instruments (familiarization) Levelling
3	04-06-2022 Saturday	Landslide Basics, Types, Causes, Morphometry		Worldwide, National and regional scenario of landslides		Contour mapping using total station, GPS instruments, data collection and processing / Total station (Procedure, Data collection and processing)		Contour mapping using total station, GPS instruments, data collection and processing / Total station (Procedure, Data collection and processing)
4	05-06-2022 Sunday	Impact of landslides, Risk Indicator, Landslides, Risk Indicators, Landslide Consequence, Warning signs.		Impact of landslides, Risk Indicator, Landslide Consequence, Warning signs, Case studies		Mapping landslide from Google Earth, various satellite and Aerial photographs. Landslide Inventory, Spatial database creation, processing and analysis		Mapping landslide from Google Earth, various satellite and Aerial photographs. Landslide Inventory, Spatial database creation, processing and analysis
5	06-06-2022 Monday	Landslide Investigation and mapping techniques, Landslide image interpretation, limitations and quantifications, Landslide Susceptibility mapping techniques.		Landslide Investigation and mapping techniques, Landslide image interpretation, limitations and quantifications, Landslide Susceptibility mapping techniques.		Practice of Landslide susceptibility mapping in GIS using various models		Practice of Landslide susceptibility mapping in GIS using various models
6	07-06-2022 Tuesday	Landslide image interpretation, limitations and quantifications,		Practice of Landslide susceptibility mapping in GIS using various models		Practice of Landslide susceptibility mapping in GIS using various models		Practice of Landslide susceptibility mapping in GIS using various models

7	08-06-2022 Wednesday	Landslide hazard and risk mapping on 1:50k using innovative approach. Landslide threshold modelling and early warning way forward.		Landslide Vulnerability and Risk assessment – Analytical Hierarchical process		Landslide Vulnerability and Risk assessment – Support vector machines – data validation through ROC method		Landslide Vulnerability and Risk assessment – Support vector machines data validation through ROC method	
8	09-06-2022 Thursday	Field Visit to Survey of India, Chandigarh							
9	10-06-2022 Friday	Rock classification, Slopes, failure types and field conditions	TEA BREAK (11.00 TO 11.15 AM)	Slope Stability, Shear strength, factor of safety, methods of analysis	LUNCH BREAK (1.00 TO 2.00 PM)	Procedure for Soil sample collection and processing (Sieve mesh Analysis) – Lab	TEA BREAK (3.30 TO 3.45 PM)	Procedure for Soil sample collection and processing (Sieve mesh Analysis) – Lab	
10	11-06-2022 Saturday	Geological Investigation, Types parameters, data collection methods		Geotechnical Investigation, Types parameters, data collection methods		Determination of Factor of safety – Direct Shear test and Triaxial shear test apparatus – Lab		Determination of Factor of safety – Direct Shear test and Triaxial shear test apparatus – Lab	
11	12-06-2022 Sunday	Field Visit to Dhalli Landslide (Shimla)		Field Visit to Dhalli Landslide (Shimla)		Field Visit to Dhalli Landslide (Shimla)		Field Visit to Dhalli Landslide (Shimla)	
12	13-06-2022 Monday	Slope kinematic study - practical class for different types of slope failure		Slope kinematic study - practical class for different types of slope failure		Structural data interpretation by stereographic projection - a practical class		Structural data interpretation by stereographic projection - a practical class	
13	14-06-2022 Tuesday	Slope stabilization techniques and cost benefit analysis		Slope stabilization techniques and cost benefit analysis		Slope stabilization measures for Rock fall failure		Slope stabilization measures for Rock fall failure	
14	15-06-2022 Wednesday	2D and 3D model of slope stability, methods, data collection and processing, case studies.		2D and 3D model of slope stability, methods, data collection and processing, case studies. Structural damage zone mapping and landslide		Analysis of Slope and Retaining Structures		Analysis of Slope and Retaining Structures	
15	16-06-2022 Thursday	Mitigation measure, Instruments and monitoring of		Sensor and Equipment's (Rain gauge / Piezometer / Extensiometer)		Landslide Fore warning systems implementations		Landslide Fore warning systems	

		landslides				and applications		implementations and applications
16	17-06-2022 Friday	Monitoring of Landslide and associated Technology		Instruments and Sensors used in the development of Landslide forewarning system		Design of Cost-effective sensors for landslide monitoring and mapping		Design of Cost-effective sensors for landslide monitoring and mapping
17	18-06-2022 Saturday	Real-time data retrieval, modelling and analysis from the Landslide fore warning systems		Real-time data retrieval, modelling and analysis from the Landslide fore warning systems		MINI PROJECT		MINI PROJECT
18	19-06-2022	Field Visit to Umri Landslide (Haryana)						
19	20-06-2022 Monday	MINI PROJECT						
20	21-06-2022 Tuesday	MINI PROJECT						
21	22-06-2022 Wednesday	Mini Project Presentation and Evaluation		Mini Project Presentation and Evaluation		Valedictory Session		