

v.	Field excursion/visit to nearby field observatory
<b>Theme 4: Geo-hazard risk analysis, safety and rescue measures</b>	
i.	Risk analysis and management
ii.	Disaster preparedness & mitigation-preventive measures and its dissemination
iii.	Post-disaster management
iv.	Disaster response, relief, recovery/rescue measures, rehabilitation and reconstruction
v.	Avalanche safety and rescue training
<b>Theme 5: Geo-informatics applications</b>	
i.	Remote sensing applications for terrain, snowpack and avalanche characterization
ii.	Integrated GIS-enabled decision support system (DSS) for snow and avalanches/landslides
iii.	Real-time avalanche path warning and navigation

### Call for participation

Participants are requested to register themselves. The detailed information is available on the drdo website ([www.drdo.gov.in/mgam-2022](http://www.drdo.gov.in/mgam-2022)). The participation will be confirmed through email by the convener.

### Registration:

For registration please fill up the attached registration form and send it to convener on email [convenermgam@dgre.drdo.in](mailto:convenermgam@dgre.drdo.in). Due to limited availability of seats, participants will be selected on the basis of their educational background/ work experience/ work domain/ training utility. Participants have to follow the COVID guidelines of Govt. while entering into the state.

### Registration opening dates

15 Nov 2021 onwards.

### Venue & Date

The international training will be held in the premises of R&D Centre, Defence Geoinformatics Research Establishment (DGRE) at Manali, Himachal Pradesh,

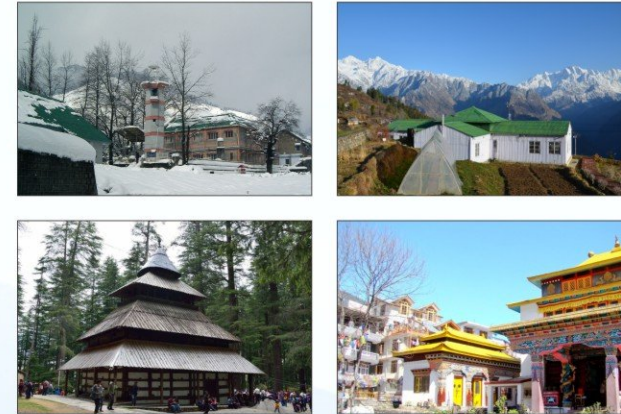
India during 21-25 March, 2022. Any changes due to unforeseen reasons (Covid-19 pandemic, etc.) at that time will be intimated.

### Field excursion/Study tour

A study tour is also planned to nearby field research station for exposure of participants.

### Accommodation

Participants are required to make their own arrangements for the duration of stay. The detail of hotels will be shared on website to facilitate the participants. Information on stay should be shared by participants to the convener for purpose of arranging transport and necessary permissions. The accommodation charges are to be borne by the participants.



### About Manali (HP)

Manali is a famous tourist place, having rich cultural heritage in and around the township. There are many tourist spots of interest, like Roerich Art Gallery, Tibetan monasteries, Vashisth Hot water spring, Hidimba Temple, Atal Tunnel, Rohtang Pass, etc. Manali is located at an altitude of 2,050 meters and temperatures in the month of March may rise as high as 26°C during days and can drop down to freezing temperature in the nights

### Convener (MGAM-2022)

Dr. Amod Kumar, Associate Director  
DGRE, Him Parisar Building,  
Plot No-1, Sector 37-A,  
Chandigarh-160036 (INDIA)  
Tele: +91 172-2699804, Extn. 204 (O)  
+91 9422330471  
Fax: +91 172-2699802/2699970  
E-mail: [convenermgam@dgre.drdo.in](mailto:convenermgam@dgre.drdo.in)

## REGISTRATION FORM

- Name: \_\_\_\_\_
- DOB: \_\_\_\_\_
- Gender: \_\_\_\_\_
- Nationality: \_\_\_\_\_
- Qualification: \_\_\_\_\_
- Occupation/Designation: \_\_\_\_\_
- ID Proof: \_\_\_\_\_
- Organisation: \_\_\_\_\_
- Address: \_\_\_\_\_
- Area of work: \_\_\_\_\_
- Work experience (Geo informatics/ Mountain geo-hazards): \_\_\_\_\_
- Contact details
  - Telephone
    - Office: \_\_\_\_\_
    - Residence: \_\_\_\_\_
    - Mobile: \_\_\_\_\_
  - Fax: \_\_\_\_\_
  - E-Mail: \_\_\_\_\_
- Covid vaccination status  
Fully vaccinated/ Partially/ Not done

Date: \_\_\_\_\_

Signature \_\_\_\_\_

Recommendation from Head of the Institute \_\_\_\_\_



## अंतर्राष्ट्रीय प्रशिक्षण पाठ्यक्रम International Training Course

on

पर्वतीय भू-आपदा आंकलन एवं प्रबंधन  
(एम.जी.ए.एम.-2022)

Mountain Geo-Hazard Assessment  
and Management (MGAM-2022)

21-25 March, 2022

at

अनुसंधान एवं विकास केंद्र, डी.जी.आर.ई.  
मनाली (भारत)

Research & Development Centre, DGRE  
Manali (India)



[www.drdo.gov.in/mgam-2022](http://www.drdo.gov.in/mgam-2022)

Defence Geoinformatics Research Establishment  
(DGRE), Chandigarh

रक्षा भू-सूचना विज्ञान अनुसंधान प्रतिष्ठान  
(डी.जी.आर.ई.), चंडीगढ़

Defence Research & Development Organization

रक्षा अनुसंधान एवं विकास संगठन



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### Brief Introduction

Natural disasters strike countries, both developed and developing alike, causing enormous destruction and human suffering, thereby have an adverse impact on society and economies. Avalanches, landslides, Glacier Lake Outburst Flood (GLOF), Landslide Lake Outburst Flood (LLOF) and cloud burst, etc., are the major threats faced by the countries in the Himalaya. It has become a challenging task for the Government and society to find solution of these hazards for hilly states development, growing mountain infrastructures such as highways, tunnels, power transmission lines, tourism, etc. Recent advancements in the existing technologies have helped to understand the spatial distribution of geo-hazard and further improvements in avalanche and landslide mitigation measures/ schemes. It has enabled hazard management authorities in planning and implementation of hazard reduction programmes. Defence Geoinformatics Research Establishment

(DGRE) is in the forefront for development of new technologies and providing engineering solutions for the mitigation of the avalanche and landslide risk in the Himalayan regions.

प्राकृतिक आपदाएं विकसित एवं विकासशील देशों में समान रूप से भारी तबाही करती हैं तथा समाज व अर्थव्यवस्था पर नकारात्मक प्रभाव डालती हैं। देश के हिमालय क्षेत्र, सामान्यतः हिमस्खलन, भूस्खलन, ग्लोफ (ग्लेशियर झील के फटने से उत्पन्न बाढ़), ललोफ (भूस्खलन जनित झील फटने से उत्पन्न बाढ़) और बादल फटना आदि जैसी आपदाओं का सामना करते हैं। पर्वतीय प्रदेशों के विकास व बढ़ती हुई मूलभूत सुविधाएं जैसे कि हाइवे, सुरंगें, पावर वितरण लाइनें, पर्यटन आदि उद्देश्यों को पूरा करने के लिए इन आपदाओं का हल निकालना एक चुनौतिपूर्ण कार्य है। नई प्रौद्योगिकी की उपलब्धता से भू-आपदाओं (हिमस्खलन व भूस्खलन) का स्थानीय वितरण समझने व निवारण प्रदान करने में मदद मिली है। इसने आपदा प्रबंधन संबंधित योजना बनाने व उचित कार्यान्वयन में सहयोग दिया है। रक्षा भू-सूचना विज्ञान अनुसंधान प्रतिष्ठान (डी.जी.आर.ई), हिमालय क्षेत्र में हिमस्खलन एवं भूस्खलन आपदा निवारण के लिए नई प्रौद्योगिकी का विकास तथा अभियांत्रिक हल प्रदान करने में अग्रिम स्थान रखता है।

This training will provide a common platform for national and international experts/scientific community /researchers working on subject to disseminate and exchange the expert knowledge and renewed actions to address the problems of snow avalanches, landslides, GLOF, LLOF etc. With availability of international experts/speakers, the course modules will improve the analytical capabilities and observational skills of the participants.

यह प्रशिक्षण इस क्षेत्र में कार्य करने वाले राष्ट्रीय व अंतर्राष्ट्रीय विशेषज्ञों, वैज्ञानिकों, शोधकर्ताओं को इन आपदाओं से संबंधित विषयों की जानकारी आदान- प्रदान करने तथा हल हेतु नवीनतम तकनीकों का ज्ञान सामान्य प्लेटफॉर्म पर रखने का अवसर प्रदान करेगा। इस प्रशिक्षण पाठ्यक्रम में राष्ट्रीय तथा अंतर्राष्ट्रीय विशेषज्ञों की उपस्थिति से प्रतिभागियों के विश्लेषणात्मक तथा निरीक्षणात्मक कौशल का विकास होगा।

Theme 1: Geo-hazard formation and its characterization	
	<ol style="list-style-type: none"><li>Hazard assessment</li><li>Hazard formation: mountain snowpack processes</li><li>Avalanche formation</li><li>Principles of snowpack evolution modeling</li><li>Advanced snow material characterization techniques</li><li>Advanced snow profile measurement tools</li><li>Genesis of landslides and movement</li></ol>
Theme 2: Geo-hazards mapping, monitoring and forecasting	
	<ol style="list-style-type: none"><li>Hazard mapping and zonation</li><li>Acoustic emission (AE) based avalanche slope stability assessment system</li><li>Avalanche detection and localization</li><li>Predictive modeling of snow avalanches and landslides</li><li>Classification techniques of snow avalanches and landslides</li><li>Techniques used for avalanche forecasting</li><li>Field data collection and forecast dissemination techniques</li><li>Mountain weather forecast</li><li>Analog ensemble (AE) system for real time local scale weather forecasting</li><li>Landslide monitoring system</li></ol>
Theme 3: Geo-hazard dynamics and control measures	
	<ol style="list-style-type: none"><li>Avalanche dynamics: models/techniques</li><li>Landslide/ GLOF dynamics</li><li>Planning for structural control measures</li><li>Artificial triggering techniques</li></ol>