

## **Education in the alpine environment - study programmes available throughout the world**

Workshop on current problems of high mountains protection in Norway and the Slovak Republic, Bø, 27.4.2015 - 1.5.2015

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At present, mountainous environments can be studied at various levels. Educational institutions around the world are offering either minor study programmes or courses, bachelor study programmes, master and PhD programmes specialised in mountainous area.

### *Courses*

For example Fort Lewis College in Colorado offers a Mountain Studies Minor. It is a regionally focused, globally relevant interdisciplinary and experiential exploration of mountains and their role in human mythology, history, culture, and the social and natural sciences. The Mountain Studies minor offers an exciting opportunity to study the role of mountains in human culture and natural history, and to experience firsthand the vast mountainous terrain in southwest Colorado and beyond while attending Fort Lewis College. A unique partnership between Fort Lewis College and the Mountain Studies Institute in Silverton, Colorado enhances the student's experience available in this innovative programme (www.fortlewis.edu 2015).

The next institution, The Mountain Studies Institute in Colorado offers educational seminars and certificate programmes for university students and others. In 2015 it offered two internship programmes - Mountain Science Internship programme, developed for incoming high school juniors, seniors, or college freshmen and Four Corners Federal Lands Internship for college students or recent graduates. Interns of Mountain Science Internship programme will gain hands-on experience contributing to real world environmental science projects. They will delve into topics such as air and water quality, climate change, mine reclamation, fen restoration, and forest health. Four Corners Federal Lands Internship connects regional college students and recent graduates with resource managers to gain the knowledge and skills. The major goal of the programme is to better prepare the next generation of agency personnel (www.mountainstudies.org 2015).

Institute of Arctic and Alpine Research (INSTAAR) which belongs to University of Colorado focus on polar and alpine regions, where effects of global change are especially pronounced. Their research has broadened to include environmental challenges that span local, regional, and global scales. Research topics vary widely and include Quaternary and modern environments, human ecosystem ecology, biochemistry, landscape evolution, hydrology, oceanography and climate. It offers a wide range of courses, for example: Organic Geochemistry, Hydrologic Field Methods, Biogeochemistry, Oceanography etc. (www.instaar.colorado.edu 2015).

Several courses are offered also by Canadian Mountains Studies Initiative at The University of Alberta in Canada. In 2015 they offered 2 courses related to alpine environments - The Mountain World: An Introduction to Interdisciplinary Mountain Studies and Introduction to Mountain Backcountry Field Skills. Mountain Studies is an interdisciplinary field of study focusing on the physical and human dimensions of mountain environments. Coursework emphasizes the physical (glaciers, climate, geology), biological (flora, fauna, ecology), physiological (issues and challenges to the human body while living, performing and working in mountain environments), and cultural (societies, literatures, histories) dimensions of these unique regions and landscapes, as well as a critical analysis of the processes of change and influence shaping local and regional mountain environments around the globe, past and present. The interdisciplinary teaching team is comprised of a glaciologist, a physiologist, an ecologist, and a historian. Introduction to Mountain Backcountry Field Skills is condensed one-week PAC course is designed to impart an introduction to the theoretical, technical, and personal leadership skills used in basic mountain backcountry field operations for scientific research, outdoor recreation, tourism, and/or educational purposes (www.mountains.ualberta.ca 2015).

The Mountain Institute in USA runs a Mountain Learning Programmes. They bring adventure, conservation, and education together in an academically rigorous environment. The many courses offered through these educational programmes focus on leadership development and cooperation through hands-on activities and exploring the outdoors.

IPROMO - International Programme on Research and Training on Sustainable Development is another programme related to mountains. It was conceived and organized by the Mountain Partnership Secretariat at Food and Agriculture Organi-

zation of the United Nations (FAO), the UNESCO, within the framework of the UN Decade of Education for Sustainable Development and the University of Turin. The programme includes courses in the fields of natural sciences, forestry, socio-economics. The final objective is the training of students, researchers, technicians for the management of mountain areas, characterised by considerable ecological, social, economical complexity. Moreover, the aim is to provide scientific knowledge and to enhance the ability of participants to assess potential ecological and social impacts of different management policies.

#### *Bachelor study programmes*

Usually many institutions throughout the world offer courses on Alpine ecology as a part of other bachelor study programmes. Example is Alpine Ecology and Environmental Management, one - year programme which can be found at the Telemark University College in Norway. The main aims of this programme is to provide the students with deeper insight into ecological, environmental and conservation issues with main emphasis on Scandinavian mountain areas. This will give the students a basis for further studies at the bachelor and master levels in ecology. Students learn about the alpine ecosystems in Scandinavia and their relation to the environment. Effects of different types of human impact e.g. decreasing traditional use, new constructions (roads and new cabins) and increasing tourism will also be outlined. The courses in this programme include mainly biology (botany and zoology), climatology, freshwater ecology, geology, and hydrogeology. Field courses are important parts of the programme, and the students will learn to identify common alpine plants and animals and geological and hydrogeological fieldwork. Practical training in sampling of field data is also included, and the sampled data will be analyzed in laboratory classes ([www.hit.no](http://www.hit.no) 2015).

#### *Master study programmes*

At the Free University of Bozen - Bolzano and the University of Innsbruck you can find master study programme called Master in Environmental Management of Mountain Areas. These two universities developed an international Master programme which focuses on sustainable landscape development as well as ecosystem and land - use management in mountain regions. The cooperation between these universities combines in an integrative way the ecological as well as the socio - economic perspective of ecology and management of mountain landscapes ([www.unibz.it](http://www.unibz.it) 2015).

Another programme can be studied at The University of the Highlands and Islands, UHI Millennium Institute, Scotland. They offer Master in Sustainable Mountain Development. It is an online, part-time interdisciplinary programme with exit awards at Postgraduate Certificate (PGCert), Postgraduate Diploma (PGDip), and MSc levels. The programme offers advanced theory and practice to provide a clear understanding of the complex issues of mountain areas. Students will engage with aspects of practice common to many disciplines and situa-

tions, and apply their newly acquired skills to their areas of expertise and interest.

The University of Natural Resources and Life Sciences in Vienna offers Master in Mountain Forestry at Institute of Forest Ecology. This programme incorporates the current scientific and economic state of the art in mountain forest management. While it also covers theoretical aspects. The improvement of participants applied skills in this area is the main goal of the programme. This in turn directly translates to a substantial increase in their employability. In order to gain practical experience students also take part in three mandatory field exercises, where they can apply newly learnt concepts in a controlled setting. Master's Programme in Mountain Forestry graduates work in governmental organisations, non-governmental organisations (NGO), and national parks in conservation and natural resource management. They work in international organisations as consultants and as experts in research for development in mountain regions.

The University of Lausanne offers Master in Geography, subject area Geomorphology and Management of Mountain Regions. The programme offers an interdisciplinary programme at the interface of Geosciences and Environmental Sciences; a general reflection on the organisation of territories, of technical networks and of spatial, natural and human systems on different spatial scales; an in-depth reflection on the transformations of urban spaces in a perspective of sustainable development: eco-urban planning, city policies, urban planning; an in-depth study of the natural dynamics of the Alpine environment and its evolution linked to climatic changes, socio-economic changes and territorial development; a critical analysis of the diversity and complexity of the socio-economic and environmental transformations of southern countries; an emphasis in teaching on the use of quantitative methods (Spatial Analysis, Geomatics, Geovisualisation) ([www.studyinginswitzerland.ch](http://www.studyinginswitzerland.ch) 2015).

The University of the Punjab in Pakistan offers Master in Mountain Conservation and Watershed Management. This two-year MSc degree course aims to provide a critical understanding of mountain conservation and watershed management techniques and the socio-economic, political, cultural and organizational issues within which management decisions are made. This interdisciplinary course is led by academics in the University of the Punjab, supported by experienced practitioners, all of whom have considerable national and international expertise. Case studies from both the developed and emerging worlds will be used as examples of different solutions to conservation problems. The MSc degree programme is based on the combination of course work and research. To qualify for the MSc degree, a student must pass a minimum of 9 subjects (papers) and undertake and defend the MSc research project based on use and application of learned techniques to the problems of practical nature ([www.cimr.edu.pk](http://www.cimr.edu.pk) 2015).

A double Master's degree course - major in Regional Management in Mountain Areas is offered by two universities. The degree programme at the Weihenstephan-Triesdorf University of Applied Sciences bears the name "Regional Manage-

ment in Mountain Areas" (MSc), and at the Bern School of Agricultural, Forest and Food Sciences is known as "Life Sciences - Regional Management in Mountain Areas" (MSc). Students of this programme will be concerned with agricultural and forest production in the Alpine region, specific natural hazards and risk management, current methods for geospatial analysis (such as GIS), project management, regional planning, nature reserves, tourism, leadership and human resources management, public relations and conflict management ([www.hswt.de](http://www.hswt.de) 2015).

The University of Sheffield in Great Britain offers a Master in Polar and Alpine Change. This programme explores environments, and underlying causes for change, in cold climate parts of the globe. The course educates graduates from a range of science-based disciplines in the concerns over polar and alpine regions by teaching them about the environments found there, and their ongoing changes, whilst delivering skills in scientifically analysing and interpreting these changes. The course has a strong research emphasis, and provides training for future researchers in this environment, as understanding the mechanisms and consequences of change will be of major importance in the scientific study of the region for some time to come ([www.sheffield.ac.uk](http://www.sheffield.ac.uk) 2015).

#### *PhD study programmes*

PhD Programme in Mountain Environment and Agriculture is offered by the Free University of Bolzano in Italy. The PhD programme is focused on the study of mountain environments and on the management of mountain ecosystems. The research topics involve activities in the areas of: management biotic and abiotic resources, energetic efficiency in agro-forestry processes, climate change, renewable energies, quality of products. It has an interdisciplinary approach that involves several scientific fields (ecology, hydrology, fruit science, agricultural chemistry, biology,...) to give to PhD students a flexible expertise in solving complex questions and issues. Its official language is English. An international work placement is mandatory for a maximum period of one year ([www.unibz.it](http://www.unibz.it) 2015).

The Shinshu University in Japan offers another PhD programme: PhD in Environmental Sciences in Mountainous Area. Shinshu, a mountainous area of Japan has a great variety of natural environment. The mountainous areas are severe and sensitive in climate and its environment changes drastically in time and with steep topography. Using the advan-

tages of unique geography and geology in Shinshu, the doctoral degree program offers multidisciplinary education and research subjects, such as formation processes of mountains, environmental change of mountain areas, environmental preservation, and disaster prevention ([www.shinshu-u.ac.jp](http://www.shinshu-u.ac.jp) 2015).

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