

ENV-617

**Snow Science Winter School (WSL)**

Löwe Henning, Various lecturers

Cursus	Sem.	Type
Civil & Environmental Engineering		Opt.

Language of teaching	English
Credits	3
Session	
Exam	Project report
Workload	90h
<b>Hours</b>	<b>85</b>
Lecture	15
Exercises	30
Practical work	40
<b>Number of positions</b>	<b>25</b>

**Frequency**

Every year

**Remark**

Next time: Feb. 2024. For registration, see website

**Summary**

The modern techniques and methods to measure snow properties in the field and in the laboratory are introduced by specialists in the corresponding field. The methods are applied in the field and in the laboratory and a report prepared using the measured data.

**Content****Objectives**

The cryosphere forms an integral part of the climate system of the Earth. Measuring the properties of the seasonal and perennial snow cover properties is therefore essential in understanding interactions and feedback mechanisms related to the cryosphere. Snow is an extremely complex and highly variable medium, and all essential properties of seasonal snow cover are challenging to measure. Diverse fields such as hydrology, climatology, avalanche forecasting and Earth Observation from space benefit from improved quantification of snow cover properties, in particular related to the snow microstructure. The past 10 years snow science has seen a rapid change from a semi-quantitative to a quantitative science. Understanding physical and chemical processes in the snowpack requires detailed measurements of the microstructure. The Snow Science Winter School will teach these advanced techniques, as micro-tomography, measurement of specific surface area by reflection and spectroscopy, near-infrared photography and high-resolution penetrometry. The course in 2020 takes place at Col du Lautaret, France, in the premises of the  $\zeta$ Station Alpine Joseph Fourier  $\zeta$ .

**Target audience**

Any graduate student or post-doc working on snow or in some snow related field is welcome to participate. Those fields include Glaciology, Hydrology, Oceanography, Geography, but also Biology or Chemistry as well as Engineering or Material Sciences.

**Course structure**

The focus of this workshop lies on field and laboratory measurements, combined with theoretical lessons in the classroom. Obligatory reading is provided about one month before the workshop, and will be examined during the school. Field and laboratory measurements will be done in small groups of 3-4 students. Each group of students will have to prepare a report describing the methods, results and interpretation of the measured data after the course. For details and application see: <http://www.slf.ch/more/snowschooll>

**Learning outcomes**

*By the end of the course, the student must be able to:*

Measure snow properties using modern methods and able to choose the correct method

### **Keywords**

cryosphere; methods

### **Learning Prerequisites**

#### **Required courses**

Snow physics and hydrology

### **Resources**

#### **Websites**

- <https://www.slf.ch/en/about-the-slf/events-and-courses/snow-science-winter-school.html>