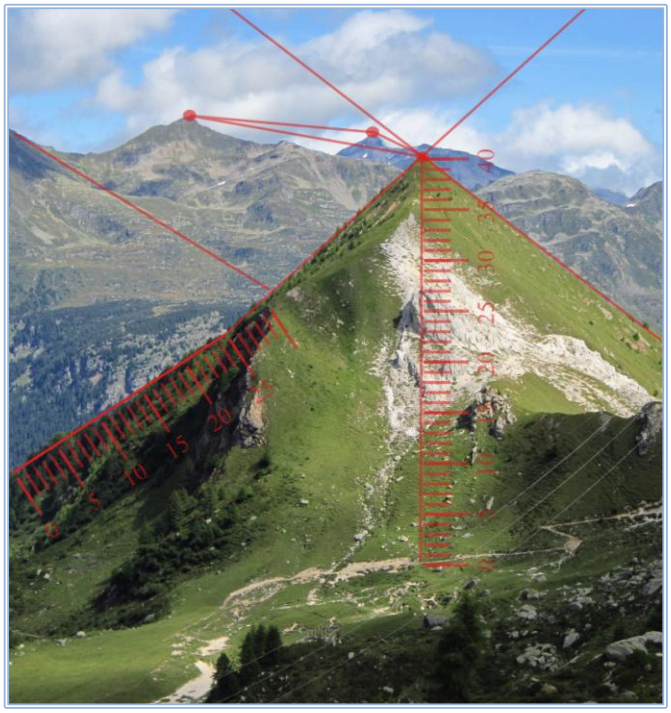
MAT 115T, Measuring the Alps
Department of International Management and Math, Fall 2018



1. Course Information

Instructor: Erich Prisner
eprisner@fus.edu
Office Hours:
M 12:00-13:00, 17:15-17:45
W 14:30-15:30,
Th 12:00-13:00,
and by appointment, LAC 11
Class location: LAC 2
Class Meeting times: MTh 16:00-17:15
Final Exam: Mon Dec 10, 16:00-18:00

2. Course Description (from the Catalog)

People live in three-dimensional space but are restricted to the earth surface which is usually locally flat, two-dimensional. But when entering the Alps, the third dimension of height becomes important when describing location or movement. This is also expressed by the fact that in the mountains a map is not too useful—rather a topographic map is needed. Starting with a description of the Alps or any mountains by topographic maps, or mathematically as functions with two independent variables, students will investigate how certain well-known features are reflected by the topography of the area . Examples are the location of mountain brooks, watersheds, movement of glaciers, avalanches, and rockfall. Students will also investigate the question of visibility in the mountains, whether and how it is possible to predict what can be seen from where. A further aspect is GPS technology. During the travel, the class will visit various places in the Swiss, Austrian, and Italian Alps, such as Davos, Innsbruck, Meran. Students will hike and measure, but will also discuss questions relevant to Alpine life, such as glaciers, avalanches or rockfall forecasts. If possible, the class will also visit places where such research is conducted. The course includes one mandatory weekend hike in September in addition to the ordinary travel in October. Hiking boots are required.

3. Rationale

This 3-credit travel course counts towards the 3-credit travel requirement. By passing this course, students will also satisfy the quantitative reasoning requirement (but note that it will not prepare for 200-level Mathematics classes).

4. Course Goals

The goal of the course is to introduce the students to a variety of scientific topics and methods connected with mountain areas, with emphasis on the mathematical methods.

5. Specific Learning Outcomes

Upon completion of this class, students should

- Be able to use a topographic map for planning of tours, and for orientation during tours. Ideally students should be able to clearly predict the tour from the map, including what can be seen when;
- Have obtained a theoretical understanding of the prominent points and structures in a landscape, like peaks, passes, pits, watersheds, ridges, level lines, slope lines, etc, and their interconnection;
- Have learned some basic geometry and enough trigonometry to be able to (roughly but creatively) measure distance, elevation, inclination, aspect, etc in mountain areas using elementary tools like compass, measuring tapes, clinometers, cameras, and understand how GPS works;
- Understand how digital elevation models (DEMs) are used to calculate some of the parameters we are interested in a landscape.
- Have learned a few facts on various non-mathematical topics in the Alps, as natural dangers in the mountains, geology, the culture(s) of the Alps region, flora and fauna, some economical issues;
- Have improved their ability to behave responsible in teams, during academic work, but also when hiking and measuring in the mountains;

6. Required Materials

There is no textbook for this course. Material will be distributed.

7. Assessment Overview

At the end of the semester, you will receive a score from 0 to 100%, based on the following:

- Assignments (between classes, in-class assignments, on travel): 30%
- Class minutes: 10%
- Participation in class and during travel: 10%
- (Group) Research Paper: 10%
- (Group) Oral Presentation: 10%
- Midterm and Final: 30% (10%+20%)
- Nonattendance may lower your score.

8. Assessment Details

Assignments:

At least once every week there are some assignments. For each assignment, students will get an overall grade of A, B, C, D or F (for failing to turn it in at the

deadline). Assignments are also due during parts of travel, sometimes to be done in groups. There will also be some graded in-class assignments. Some assignments will carry double weight.

Minutes:

Each class I will ask two students to write minutes/notes of the class. These minutes should contain, in a structured way, the issues taught or discussed during class. The minutes should be about 1 page length (typed), and are due next class. They will be graded, and an edited version will be distributed to all students later. Each student will do this twice.

Class Participation:

Participation includes active listening, asking relevant questions, participating in class discussion, responding thoughtfully to other student's contributions, both during classes in Lugano and on travel. Participation also includes attendance both during classes and travel.

Research Paper:

Each student has to write a research paper, either alone or in a group of 2 students. Before travel students will have to find/choose a research question and a plan how to obtain information, both from sources and also from experiments during travel.

Oral Presentation:

The content of each paper has to be presented to the class.

Midterm and Final:

There will be a midterm, where facts you were supposed to have learned for our travel are tested. In the final, in addition to the material treated before travel, you will also be asked about what you were supposed to learn during travel and also from the student presentations after travel.

9. Grading Scheme

Final grades will be determined as follows:

	A: 93 - 100 %	A-: 90 - 92.9 %
B+: 87 - 89.9 %	B: 83 - 86.9 %	B-: 80 - 82.9 %
C+: 77 - 79.9 %	C: 73 - 76.9 %	C-: 70 - 72.9 %
D+: 67 -69.9 %	D: 63 - 66.9 %	D-: 60 - 62.9 %
F: below 60 %		

10. Expectations

You are required to hand in the assignments in time. During class time and during travel you are supposed to contribute actively, to listen to others, to behave responsibly, and to try to build a community. Laptop use is only allowed if related to the class and may be banned. Cell phones are not allowed on the desk or in your hand.

After class you are supposed to review the material in the notes provided. You will have to give presentations, and develop/choose a question to research, and to write the research paper. Please check your Franklin email daily, as assignments will be distributed through MOODLE.

Class attendance is mandatory on campus, during the excursion in September, and during the 11 days of academic travel. Please don't leave during class. Please focus on the material during class and don't do anything else.

Calculator Policy: You are encouraged to use any type of calculator on homework assignments and projects. Simple calculators are also allowed in quizzes, and

tests, but more sophisticated calculators may be banned in certain quizzes and parts of tests.

11. Proper Travel Behavior

You are supposed to be in time for the travel activities, otherwise we will leave without you and your grade will suffer. If that happens, please also call me immediately. Also call me immediately (no matter what time) if you think you are in trouble.
Please respect yourself, the other members of the group, the people we meet, and the environment. This implies that you will not get drunk, that you don't drink alcohol in your hotel room, that you should not disturb others (headphones when listening to music), that you won't put shoes on chairs or desks, that you treat others with courtesy, that you will not leave any trash other than in trash cans, and that you keep your cell phones shut during lectures, to give just a few examples.
Don't put yourself or others into danger. No free climbing or bouldering is allowed. Help each other, keep an eye on each other, be a team player.
Franklin's Code of Conduct also applies during Academic Travel. If you endanger yourselves, others, or the smooth working of the class, you will be sent home (at your own expenses). Reported class 3 violations (see section 4 of the Student Handbook) during Academic Travel will automatically result in the following:

- Immediate dismissal from the Academic Travel and return to Lugano at the student's expense;
- A failing grade for the class; and
- Immediate review of the case by the Judicial Board co-chairs.

12. Academic Integrity: Statement on Cheating and Plagiarism

A student whose actions are deemed by the University to be out of sympathy with the ideals, objectives or the spirit of good conduct as fostered by the University and Swiss community, may be placed on Disciplinary Probation or become subject to dismissal from the University. Cheating and plagiarism are dishonest actions that run counter to the University ideals. Furthermore, cheating reflects negatively on one's personal integrity and is unjust to other students.

See the Academic Catalog for full statement (page 199):
https://www.fus.edu/files/FUS-academic-catalog-2018-2020.pdf

In particular, all work submitted must be your own work, and in tests you are not allowed to use notes, cell phones, talk with other students, or copy their work. In case of a violation you will get 0 points for the assignment and be reported to the Dean of Academic Affairs.

13. Resources Available

If you have questions, I am the first person to contact. You can see me during office hours but also send me an email if these hours don't work for you. Then we can find another time. The Writing and Learning Center (WLC) also offers help in Mathematics. The WLC also offers help with the project, in addition to the help I offer during office hours.

14. Course Schedule

The schedule before travel is rather tentative.

- Week 1
  - Welcome, Syllabus, latitude, longitude, elevation, topographic maps, swisstopo and other online topographic maps.
  - Peaks, pits, passes, level curves, gradient curves, compasses, simple visibility.
- Week 2
  - Walk around the University.
  - Some Geography, Ticino, Alps, Watersheds.
- Week 3
  - Digital elevation models (DEMs), slope, slope of terrain, aspect, and other parameters and how to derive them from topographic maps and DEMs.
  - Hiking paths, profiles and times,
- Optional Weekend Excursion, Sunday Sept 16
- Week 4
  - Hiking time formulas
  - Prominence, surface networks
- Week 5
  - Surface networks
  - Trigonometry, measuring with triangles
- Week 6
  - Trigonometry, measuring with triangles
  - Open business, or TBA
- Week 7
  - Visibility, measuring height with your camera
  - Midterm
- Week 8
  - Glaciers, permafrost, climate change, avalanches
  - Open business, or TBA

Sunday 21.10 – Th 1.11. Travel

Note that we will also have a few classes during travel.
For the part after the travel there is no course schedule yet—it will be developed as we go.
Note also that we will not use all meeting times after travel.

Final Exam: Mon Dec 10, 16:00-18:00

15. Tentative Travel Itinerary

The schedule before travel is rather tentative.

- Sunday October 21: We leave by bus to Poschiavo. In the afternoon we might have a light walk/hike.
- Monday October 22: Morning hike or other activity, depending on weather. In the late afternoon we will probably have a talk on AlpFoodways (together with Dean Steinert-Borella's group)
- Tuesday October 23: 5-6 hours Hike together with Dean Steinert-Borella's group.
- Wednesday October 24: We leave by bus to Bozen. In the afternoon we visit Messner's Alpine Museum.

- Thursday October 25: Class meeting in the morning. Museum visits and maybe a visit to the University of Bozen.
- Friday October 26: We leave by bus to the Bletterbachschlucht. We will have a 4-5 hours guided tour there. Then the bus will take us to our hotel in Villnoess.
- Saturday October 27: 5-6 hours hike in the Dolomite mountains around Villnoess.
- Sunday October 28: We leave by bus to Innsbruck. We do a hike/excursion either Sunday afternoon or on Monday.
- Monday October 29: Class meeting in the morning.
- Tuesday October 30: We leave by bus to Zernez. In the afternoon we might do a light hike.
- Wednesday October 31: Lecture on the Swiss National Park, followed by a 5-6 hours guided excursion in the park.
- Thursday November 1: A bus brings us back to Lugano. We will arrive in the afternoon.