



Engineering Geodesy I

Autumn Semester 2010

Overview of Engineering Geodesy I

- Lectures, exercises primarily indoors, 2 excursions
- Every Wednesday from 13:45 to 16:30
- Place: HIL D 53 or HIL C 71.3 (see [program](#))

- exercise 0: demonstration of relevant sensors in Engineering Geodesy
- exercise 1: sensor measurements and data handling / visualization
- exercise 2: deformation & monitoring measurements
- exercise 3: Own Engineering [Geodesy Project](#). Presentation of results.

- Website EG 1: <http://www.geometh-data.ethz.ch/student/eg1/index.htm>
(will be updated continuously during the term)

- division into groups: today, 22. September 2010

- further details: see program handout

EG I Program

Wednesday, 13:45 – 16:30

HIL D 53 / HIL C 71.3

| Date | 13:45 – 14:30 | 14:45 – 15:30 | 15:45 – 16:30 |
|---------------|---|---|---------------|
| Wed, 22.09.10 | Administration D 53 Mautz | L: Introduction D 53 Ingensand | |
| Wed, 29.09.10 | LE: Instruments, Sensors, Beacons (Demonstration) C 71.3 & C 71.2 Ingensand, Mautz | | |
| Wed, 06.10.10 | LE: Instruments, Sensors (Demonstration) C 71.3 & C 71.2 Ingensand, Mautz | | |
| Wed, 13.10.10 | L: Sensor Networks C 71.3 Mautz | L: Sensors for Indoor Positioning C 71.3 Mautz | |
| Wed, 20.10.10 | E: Sensor Data Flow & Visualization C 71.3 Mautz | | |
| Wed, 27.10.10 | X: 13:00 Excursion to the Paul Scherrer Institute Bus Stop ETHZ Höggerberg, Mautz, Ingensand | | |

EG I Program

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|---------------|---|--|
| Wed, 03.11.10 | E: Deformation Analysis & Monitoring using TPS C 71.3 Mautz | |
| Wed, 10.11.10 | L: Deformation Analysis D 53 Mautz | E: Eng. Geodesy Project C 71.3 Mautz, Theiler |
| Wed, 17.11.10 | Rothacher: Satellite Geodesy, Compensation for Excursion | |
| Wed, 24.11.10 | E: 12:00 Engineering Geodesy Project, Object observation Mautz, Theiler | |
| Wed, 01.12.10 | L: Barrages, Dams, Natural Hazards, Bridges, Towers D 53 Ingensand | E: Eng. Geodesy Project C 71.3 Mautz, Theiler |
| Wed, 08.12.10 | E: Engineering Geodesy Project, Data Analysis C 71.3 Mautz, Theiler | |
| Wed, 15.12.10 | X: 7:00 Excursion to AlpTransit (Ceneri, Sigrino), Zurich Main Station, Mautz, Ingensand | |
| Wed, 22.12.10 | Presentations of Engineering Geodesy Projects D 53 Students | |

Engineering Geodesy Lab

Thursday, 9:15 a.m. C 71.3 Information and Introduction (Henri Eisenbeiss)

- multi sensing as the trend of today
- current science projects

The course Engineering Geodesy Lab consists of practical projects. Different fields, applications and instruments of engineering geodesy are treated. Projects offered 2010:

Project 1

Laser scanning: determination of 3D-objects, dataflow, data modelling, visualization, scanning of a side tunnel, modelling of the objects with appropriate software

Project 2

3D coordinate transfer in a building: 3D-networks, plumbing, direction transfer with gyro-theodolite.

Project 3

GNSS measurements on an UAV (octocopter), real-time versus post-processing

Language

- Officially: English
- Lecture Notes and Slides : English (some residual slides in German remain)
- Communication: Deutsch? If all participants understand German, German can be used.

➤ Lectures:

Prof. Dr. H. Ingensand, ingensand@geod.baug.ethz.ch

➤ Organization and Exercises:

Rainer Mautz

[mautz @ geod.baug.ethz.ch](mailto:mautz@geod.baug.ethz.ch)

HIL C 45.2

Tel. 044-6337827

Goals

- Getting insides of sensors, measuring methods, applications for Engineering Geodesy
- Learning about the difficulties of setting up sensors and read, transfer, store and visualise sensor data
- Practical work with instruments (Leica 1200 TPS)
- Impressions of monitoring tasks in industry (excursion)
- Carry out and present your own project in Engineering Geodesy

Credit Requirements, Examination

- Credit Points Requirements:
 - presence at all lectures, demonstrations, excursions and exercises
 - carrying out exercises in groups of 4
- Examination:
 - oral in pairs of two students (30 minutes) or single (15 minutes) – January / February 2011

examination period: 4. – 7. week of calendar year

http://www.rektorat.ethz.ch/students/exams/diploma/examsession/index_EN

Lecture notes and additional reading material

- Möser, M.; Müller, G.; Schlemmer, H.; Werner, H. [2000]: Handbuch der Ingenieurgeodäsie - Grundlagen. 3. Neubearbeitete Auflage, Wichmann, Heidelberg.
- Skript in German: Ingenieurgeodäsie und Geodätische Messtechnik III, 2004
 - ca. 250 pages, 30.- Fr.
 - does not completely cover EG I and EG II
- in English: not yet released
 - a variety of scientific papers and practical experience reports in PDF-format will be provided

All lectures, exercises, news and information is provided online and updated regularly at:

<http://www.geometh.ethz.ch> follow the link: Students (restricted)

Login with D\

Further recommended reading material is provided online for downloading on the EG I page <http://www.geometh-data.ethz.ch/student/eg1/index.htm>

Excursion 1



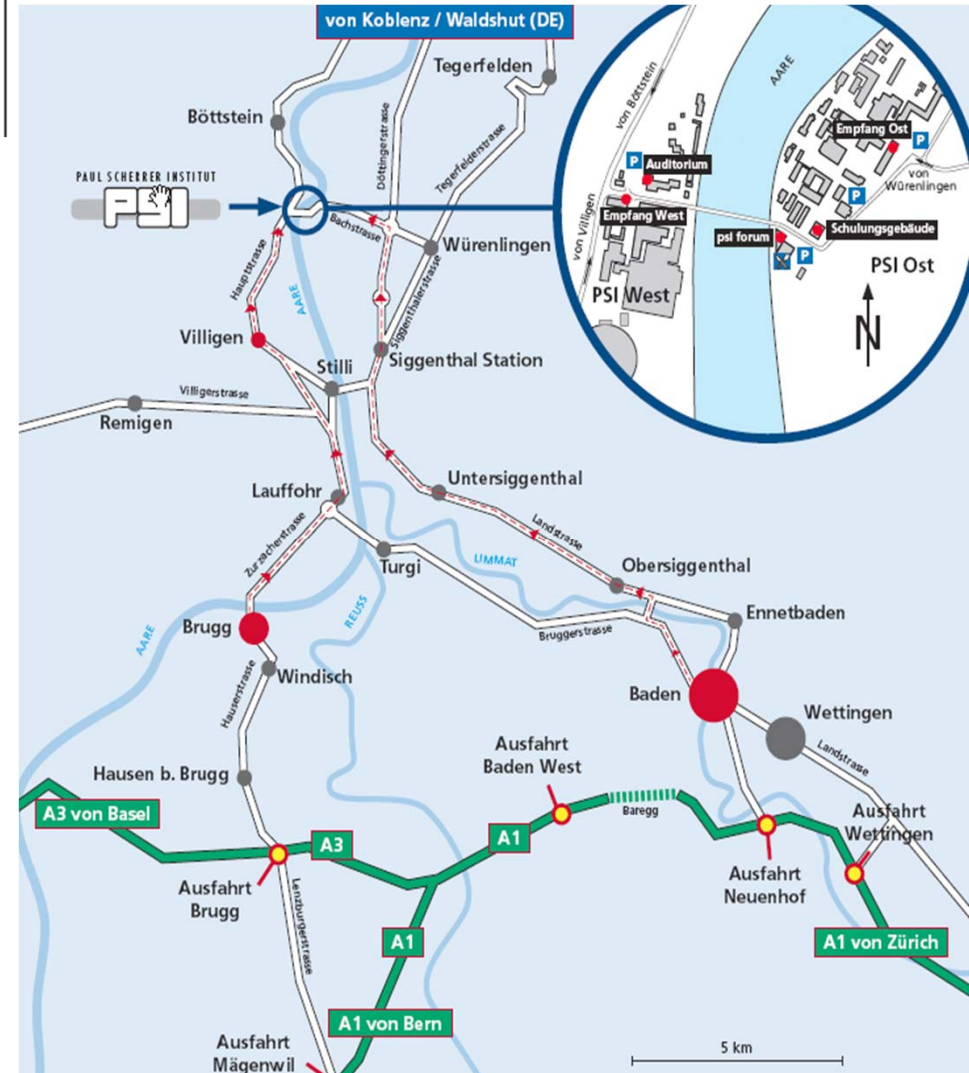
1. Excursion to PSI (Paul Scherrer Institute)

Date: Wednesday, 27.10.2008,
13:00 – ca. 17:30 pm

Place: Bus Stop Hoenggerberg
to Villingen,
N 47° 32.317'
E 8° 13.808'

Guidance: Edi Meier + Partner AG

Contents:
PSI Forum
Swiss Light Source
(SLS), HLS:
Applied Geophysics
Ground Motion and
Vibration Monitoring



Excursion 1

1. Excursion to PSI

- Auf Ihren Besuch im Paul Scherrer Institut freuen wir uns. Um 14.00 Uhr wird Sie Werner Joho beim Besucherzentrum psi forum empfangen und betreuen.
- Folgendes Programm haben wir nach Ihren Wünschen zusammengestellt:
 - - psi forum - PSI im Überblick, Einführung zur Synchrotron Lichtquelle Schweiz
 - - Pause: Getränke und Guetzli offeriert vom PSI
 - - Besichtigung der Synchrotron Lichtquelle Schweiz (HLS System durch Herrn Edi Meier)
- Gegen 17.00 Uhr wird die Führung zu Ende sein.

Excursion 2

Excursion to AlpTransit Faido ,

Date: Wed, 15.12.2010, whole day

Place: Meeting Point Zurich Station (Train leaves 7:09 a.m)



- 9:49 Arrival in Taverne-Torricella, Pick-up by AlpTransit (Bus)
- 10:30 Information Ceneri-Tunnel, Surveying Projects
- 12:30 Lunch in cantine
- 14:00 Visit of underground construction sites
- 16:04 Leave from Lamone-Cadempino (Train)
- 18:49 Arrival in Züri Main Station

Excursion II

- EG 1 Participants automatically subscribed
- Please report conflicting dates! Lecture times with Prof. Rothacher have been swapped.