

CIVIL-465

**Introduction to research skills (for GC)**

Althaus Barbara, Beyer Katrin, Weil Charlotte Gisèle

<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Civil Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	2
Session	Winter
Semester	Fall
Exam	During the semester
Workload	60h
Weeks	14
<b>Hours</b>	<b>2 weekly</b>
Courses	2 weekly
Exercises	0 weekly
<b>Number of positions</b>	

**Summary**

The course prepares students for carrying out research-based Master projects. It teaches basics of scientific writing and presenting as well as concepts and tools that are useful over the course of a research project.

**Content**

The course covers the following topics:

- Research: what it is and which rules apply (peer-review, copyrights and plagiarism, reproducibility and open science); project management of a research project.
- Scientific writing: Literature research, correct citations, plagiarism; Structuring of a Master thesis; Good scientific writing (vocabulary, coherence and cohesion, paraphrasing).
- Scientific presenting: Defining the target audience; Structuring a presentation; Slide design.
- Research data: Introduction of FAIR principles for data, good principles of research data management, metadata of research data.
- Data visualisation: Introduction to data visualisation / design of figures.
- Coding for research: Good coding practice, version control, reproducibility.

The course introduces tools for scientific writing, referencing, code and data management tools, in particular:

- LaTeX (document preparation system),
- Zotero (reference manager),
- Zenodo (data repository),
- Python (programming language),
- Jupyter notebook and Jupyter Lab (interactive programming environment),
- Github (code hosting and version control tool),
- Renku, Docker and Anaconda (programming environment reproducibility tools),
- Python libraries for data visualization (e.g., matplotlib, seaborn, Bokeh),
- ...

**Keywords**

Research skills, scientific writing, scientific presenting, research data management, coding

**Learning Prerequisites**

**Required courses**

A little programming experience would be helpful but is not mandatory.

**Learning Outcomes**

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

- Plan a research project;
- Structure a research report and a presentation;
- Apply principles of effective scientific writing;
- Apply best practices in research data management, coding and data visualisation;;
- Apply best practices for using citations in scientific writing.

**Teaching methods**

The course is based on presentations, which are followed by in-class exercises and take-home assignments. Modules of the course will be given by invited lecturers from the EPFL language center, the EPFL library and ENAC IT4Research.

**Expected student activities**

Active participation in course and exercises.

**Assessment methods**

The assessment is based on quizzes, on deliverables produced in the exercise hour and on take-home assignments.

**Supervision**

Office hours	Yes
Assistants	Yes

**Prerequisite for**

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