

MSE-420

**Cementitious materials (advanced)**

Scrivener Karen

<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Materials Science and 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>
Lecture	2 weekly
<b>Number of positions</b>	

**Summary**

Discussion of topical subjects related to the current use of cementitious materials. Through a guided literature survey prepare a presentation in a group on a topical issue

**Content**

1. Introduction - overview of structure of cementitious materials, advantages and disadvantages.
2. Hydration.
3. Supplementary cementitious materials.
4. Understanding and characterising the pore structure of cementitious materials.
5. Transport properties.
6. Durability issues.
7. Calcium aluminate cements.
8. Ultra high performance concrete.
9. Admixtures and rheology

**Keywords**

Cementitious materials, hydratin, durability, characterisation methods

**Learning Prerequisites****Required courses**

MSE 322 - Building Materials and Laboratory work

**Recommended courses**

Building materials

**Learning Outcomes**

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

- Explain Chemical and physical processes underlying the behaviour of cementitious materials
- Interpret scientific papers related to cementitious materials
- Analyze appropriateness of different characterisation techniques
- Analyze economic and ecological appropriateness of different materials solutions
- Design lecture on chosen topic

### Transversal skills

- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Negotiate effectively within the group.
- Access and evaluate appropriate sources of information.
- Make an oral presentation.
- Summarize an article or a technical report.
- Write a literature review which assesses the state of the art.

### Teaching methods

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group discussion of papers from literature

### Expected student activities

attend lectures

find relevant paper from search engines

present summary of findings

prepare lecture in team

### Assessment methods

contribution to discussion sessions throughout course

presentation at intermediate and final stages

### Supervision

Assistants Yes

Forum No

### Resources

#### Bibliography

Via search engines, e.g. scopus

#### Notes/Handbook

Handouts for lectures to be annotated by students

#### Moodle Link

- <https://go.epfl.ch/MSE-420>