

CH-435

**Catalytic asymmetric reactions in organic chemistry**

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Cursus	Sem.	Type
Chimiste	MA2, MA4	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	During the semester
Workload	90h
Weeks	14
<b>Hours</b>	<b>2 weekly</b>
Courses	2 weekly
<b>Number of positions</b>	

**Summary**

This lecture presents the development of catalytic asymmetric reactions in organic chemistry, including important current topics of research in the field.

**Content**

Principles and Methods of Catalysis:

1. Asymmetric activation of electrophiles with Lewis and Bronsted acids.
2. Asymmetric activation of nucleophiles with metal- and organo-catalysts.
3. Dual activation with acid-base, metal-base, metal-metal and single metal systems.
4. Umpolung of reactivity.

**Learning Prerequisites****Recommended courses**

General master level knowledge in organic chemistry is highly recommended (including EPFL lectures organic reactions and fonctions I-III, asymmetric synthesis, retrosynthesis, structure and reactivity, or similar lectures in other institutions). Basic knowledge in organometallic chemistry is also recommended.

**Learning Outcomes**

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

- Elaborate on the concepts of catalysis and stereoselectivity described in a recent publication
- Formulate in details the following points in a publication: type of reaction, principle of reactivity, catalytic activation and asymmetric induction, full catalytic cycle
- Critique the content of a recent publication in the context of the knowledge in the field

**Transversal skills**

- Access and evaluate appropriate sources of information.
- Make an oral presentation.
- Summarize an article or a technical report.
- Take feedback (critique) and respond in an appropriate manner.
- Communicate effectively, being understood, including across different languages and cultures.

**Teaching methods**

ex cathedra presentation with summary and literature presentations by the students

### Expected student activities

active participation to the lecture  
presentation of summaries of the course  
oral presentation on recent publications in the field

### Assessment methods

Oral exam of 20 min, with 20 min preparation (recent publication) for 80% of the grade  
Two oral presentations during the lecture counting for 20% of the grade.

### Supervision

Office hours	No
Assistants	Yes
Forum	Yes

### Resources

#### Virtual desktop infrastructure (VDI)

No

#### Bibliography

power point presentation without details, need to be completed during lecture (the students will receive the slides in advance)