

CH-432

**Structure and reactivity**

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Cursus	Sem.	Type
Chimiste	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Oral
Workload	90h
Weeks	14
<b>Hours</b>	<b>2 weekly</b>
Courses	2 weekly
<b>Number of positions</b>	

**Summary**

To develop a detailed knowledge of the key steps of advanced modern organic synthesis going beyond classical chemistry of olefins and carbonyls.

**Content****1. Repetition of the chemistry of olefins and carbonyls**

- limitations

**2. Rearrangements**

- Sigmatropic: Claisen, Ireland-Claisen, Johnson-Claisen, Eschenmoser, Wittig, Evans-Mislow  
 - Reactive intermediates : cations, carbenes, nitrenes

**3. Cyclisations and Cycloadditions**

- Pericyclic reactions  
 - Diels-Alder (normal, hetero, inverse electron demand)  
 - Dipolar cycloadditions

**4. Radical- and Photochemistry****5. Strategy of Umpolung**

- Stoichiometric and catalytic

**6. Metal-catalysis in Organic Chemistry**

- Cross-coupling and metathesis  
 - Olefins and C-H bonds functionalization  
 - Synthesis of carbo- and heterocyclic systems

**Learning Outcomes**

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

- Develop a detailed knowledge of the key steps of advanced modern organic synthesis going beyond classical chemistry of olefins and carbonyls

**Transversal skills**

- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Demonstrate the capacity for critical thinking

**Teaching methods**

ex cathedra lecture

**Assessment methods**

final oral exam

## Resources

### Websites

- [http://scgc.epfl.ch/telechargement\\_cours\\_chimie](http://scgc.epfl.ch/telechargement_cours_chimie)