## Concepts of Molecular Chemistry 1

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Workload</th>
<th>Credit points</th>
<th>Available in semester</th>
<th>Frequency each WiS</th>
<th>Course duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 5</td>
<td>150 h</td>
<td>5 CP</td>
<td>1</td>
<td></td>
<td>1 semester</td>
</tr>
</tbody>
</table>

1. **Teaching methods**
   - a) Lectures
   - b) Exercises

2. **Hours per week**
   - a) 2 h
   - b) 1 h

3. **Contact time**
   - 45 h

4. **Self-study**
   - 105 h

2. **Teaching methods**
   - a) Lectures
   - b) Exercises

2. **Learning objectives**
   - Students understand molecular reactivity and the concepts of physical organic chemistry such as properties related to electron density and potential energy surfaces. They are capable of predicting the thermodynamics and kinetics of chemical reactions from simple concepts such as additivity rules, and of explaining the experimental basis of such rules.

3. **Soft skills: methodological, self, social competences**
   - Structure, summarize, and revise principal lecture contents, identify and consult relevant literature; interactively present in front of an audience
   - Evaluate scientific literature and present essential scientific contents to an audience.
   - Learn and work cooperatively, effectively communicate scientific contents to peers

4. **Prerequisite(s)**
   - Basic knowledge in Organic Chemistry (functional groups, reaction mechanisms, aromaticity, chemistry of reactive intermediates, carbanions, carbocations, radicals) and Physical Chemistry (thermodynamics, kinetics, theory of the chemical bond, vibrational spectroscopy)

5. **Evaluation of the learning process**
   - Active participation during lectures, homework corrected by teaching assistant and/or interactive presentation of homework during exercises, 20 min scientific presentation

6. **Mode of examination**
   - 30-min. oral or 2-hour written end-of-term exam, depending on class size

7. **Requirements for acquiring credit points**
   - Passing the oral examination

8. **Significance for overall grade**
   - Weighted according to CPs

9. **Module contents**
   - Concepts of covalent and non-covalent bonds, thermodynamics and kinetics of chemical reactions, potential energy surfaces, the basis of force field calculations, Benson additivity rules, linear free energy relationships

10. **Person in charge / Lecturer(s)**
    - Prof. Dr. W. Sander