

<b>Modulbezeichnung:</b> Catalysis (CME2) (Catalysis)	<b>15 ECTS</b>	
Modulverantwortliche/r:	Hans-Peter Steinrück	
Lehrende:	Hans-Peter Steinrück, Andriy Mokhir, Bernd Meyer, Sjoerd Harder, Jörg Libuda, Romano Dorta, Thomas Drewello, Assistenten, Svetlana Tsogoeva, Julien Bachmann, Wilhelm Schwieger	
Startsemester: WS 2015/2016	Dauer: 2 Semester	Turnus: halbjährlich (WS+SS)
Präsenzzeit: 195 Std.	Eigenstudium: 255 Std.	Sprache: Englisch

### Lehrveranstaltungen:

#### **A: Lectures and seminars**

Two units per 2L + 1S from the offers A1 - A8 chosen by the student.

One of the two units can be replaced either by an equivalent multidisciplinary course with a total of 5 ECTS from the field of "Erlangen Catalysis Resource Center" (ECRC) (e.g. A9 and A10) or by courses from the modules "Interfaces" or "Molecular Nanoscience".

#### **A1: N. N.**

#### **A2: Nanoparticles and nanostructured thin films (WS)**

Nanoparticles and Nanostructured Thin Films / Nanopartikel und nanostrukturierte dünne Schichten (WS 2015/2016, Vorlesung, 2 SWS, Julien Bachmann)

#### **A3: Organocatalysis (SS)**

Organocatalysis (SS 2016, Vorlesung, 2 SWS, Svetlana Tsogoeva)

Organocatalysis - Seminar (SS 2016, Seminar, 1 SWS, Svetlana Tsogoeva)

#### **A4: Catalysis and kinetics (SS)**

Catalysis and Kinetics (SS 2016, Vorlesung, 2 SWS, Jörg Libuda)

Seminar Catalysis and Kinetics (SS 2016, Seminar, 1 SWS, Jörg Libuda et al.)

#### **A5: Chemical reactions in the presence of nucleic acid-based catalysts (SS)**

Chemical reactions in the presence of nucleic acid-based catalysts (SS 2016, Vorlesung, Andriy Mokhir)

Chemical reactions in the presence of nucleic acid-based catalysts (SS 2016, Seminar, Andriy Mokhir)

#### **A6: Catalytic reactions with transition metals (SS)**

Catalytic reactions with transition metals (SS 2016, Vorlesung, 2 SWS, Sjoerd Harder et al.)

Catalytic reactions with transition metals (SS 2016, Seminar, 1 SWS, Romano Dorta et al.)

#### **A7: Modeling of catalytic processes (SS)**

Modeling of Catalytic Processes (SS 2016, Vorlesung, 2 SWS, Bernd Meyer)

Modeling of Catalytic Processes (Praktikum) (SS 2016, Praktikum, 2 SWS, Bernd Meyer et al.)

#### **A8: Modern methods in mass spectrometry (WS)**

Modern Methods in Mass Spectrometry (WS 2015/2016, Vorlesung, 2 SWS, Thomas Drewello)

Seminar Modern Methods in Mass Spectrometry (WS 2015/2016, Seminar, 1 SWS, Thomas Drewello et al.)

#### **A9: Lösungsmittelkonzepte für katalytische Verfahren (WS)**

Lösungsmittelkonzepte für katalytische Verfahren (WS 2015/2016, Vorlesung, 2 SWS, Peter Schulz)

Lösungsmittelkonzepte für katalytische Verfahren (WS 2015/2016, Übung, 1 SWS, Martin Lijewski)

#### **A10: Technische Katalyse und Adsorption (SS)**

Technische Katalyse und Adsorption / Technical Catalysis and Adsorption (SS 2016, Vorlesung, 2 SWS, Wilhelm Schwieger)

Übungen zu Technische Katalyse und Adsorption (SS 2016, Übung, 1 SWS, Wilhelm Schwieger et al.)

#### **B: Lab course in one of the lecturers working groups A1-A8 at the Department of Chemistry and Pharmacy (7 LAB)**

Lab Course Catalysis (WS 2015/2016, Praktikum, 7 SWS, Hans-Peter Steinrück et al.)

Lab Course Catalysis (SS 2016, Praktikum, 7 SWS, Hans-Peter Steinrück et al.)

### Empfohlene Voraussetzungen:

Admission to the M. Sc. program Molecular Science or Chemistry

Admission to the M.Sc. program Chemistry

## Inhalt:

### Recommended choices (based on mandatory elective modules):

For **Molecular Life Science**: (5 L, 7 Lab, 3 S) or (8 L, 0 Lab, 1 S\*)

- Molecular biology or
- Medicinal chemistry A or
- Medicinal Chemistry B
- Molecular synthesis
- Bioinorganic chemistry (from M.Sc. Chemistry)

For **Molecular Nanoscience**: (5 L, 7 Lab, 3 S) or (8 L, 0 Lab, 1 S\*)

- Molecular synthesis
- Theory
- Physical chemistry (or parts of the respective modules)

(\* = Elective module without a LAB Course)

- developing the basics of catalysis at the level of a scientifically oriented Master's program
- introduction to the current issues of research in the field of catalysis
- deepening of knowledge in a specialized field of catalysis of lecturers involved in the ECRC to the limit of current knowledge
- experimental studies on selected chapters of catalysis at an advanced level

## Lernziele und Kompetenzen:

The students

- extend their knowledge in special research focused topic
- gain Soft skills.

übernommen aus Prüfungsordnungsmodul *Wahlmodul Molecular Science*

Students

- explain the basics of catalysis
- present and compare basics of different modern experimental or theoretical methods in catalysis
- apply basic knowledge to current issues in research
- analyse experimental data and interpret results referring to literature data independently
- apply model-like descriptions for complex systems and model experimental data

## Literatur:

Depending on chosen modules/lectures (contact lecturer or lecturers web site or UnivIS)

## Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

Das Modul ist im Kontext der folgenden Studienfächer/Vertiefungsrichtungen verwendbar:

### [1] Molecular Science (Master of Science): 1-3. Semester

(Po-Vers. 2013 | Wahlmodul Molecular Science)

Dieses Modul ist daneben auch in den Studienfächern "Chemie (Master of Science)" verwendbar.

## Organisatorisches:

**Frequency of offer:** Annually (for details, see description of the Mandatory elective modules)

**Workload:** 450 hours (including 240 hours private study)

**Intended stage in the degree course:** semester 1. and 2.

## Bemerkungen:

**Language:** English, except A9 and A10 (both in German!)