Modulbezeichnung:	**Advanced electrochemistry (CE7)** (Advanced electrochemistry)	**15 ECTS**
Modulverantwortliche/r:	Dirk Guldi	
Lehrende:	Christian Ehli, Dirk Guldi	

Startsemester: WS 2019/2020	Dauer: 2 Semester	Turnus: jährlich (WS)
Präsenzzeit: 200 Std.	Eigenstudium: 250 Std.	Sprache: Englisch

Lehrveranstaltungen:

A. Advanced Electrochemistry (2L/1S)

Advanced Electrochemistry (WS 2019/2020, Vorlesung, 2 SWS, Dirk Guldi et al.)

Seminar Advanced Electrochemistry (WS 2019/2020, Seminar, 1 SWS, Christian Ehli et al.)

B. Energy-related Advanced Electrochemistry (2L/1S)

Energy-related Advanced Electrochemistry (SS 2020, Vorlesung, 2 SWS, Christian Ehli et al.)

Seminar Energy-related Advanced Electrochemistry (SS 2020, Seminar, 1 SWS, Dirk Guldi et al.)

C. Lab Course Electrochemistry (8Lab)

- Attendance in lab course is compulsory!

Lab Course Electrochemistry (WS 2019/2020, Praktikum, 8 SWS, Christian Ehli et al.)

Lab Course Electrochemistry (SS 2020, Praktikum, 8 SWS, Christian Ehli et al.)

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 (Option A) or
- Medicinal Chemistry (Option 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

A./B. lectures on advanced theoretical principles in electrochemistry, e.g. fundamental concepts, physicochemical aspects of electrolytes, transport phenomena on electrode surfaces, kinetics, cyclic voltammetry, pulsed techniques, spectro electrochemistry, electrochemical impedance spectroscopy, nano electrochemistry.

Electrochemical synthesis and procedures on industrial scale, prevention of corrosion.

Modern energy relevant topics applying electrochemistry, e.g. fuel cells and batteries, solar cells, electrocatalysis.

C. Electrochemistry lab course (7 experiments, 1-2 days each)

Lernziele und Kompetenzen:

The students gain:

- extension of the knowledge in special research focused topic
- soft skills

übernommen aus Prüfungsordnungsmodul *Wahlmodul Molecular Science*

Students

- apply advanced knowledge in theoretical and experimental electrochemistry
- explain technological and industrial processes
- discuss the experimental fundamentals of modern electrochemical measurement processes

- review current research topics
- evaluate the results of electrochemical measurements

Literatur:

Allen J. Bard: "Electrochemical Methods: Fundamentals and Applications"

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 | NatFak | Molecular Science (Master of Science) | Wahlmodul Molecular Science)

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

Organisatorisches:

Module frequency:
A./B. annually
C. March/April (mandatory registration via **StudOn**)
Please note: module starts only in **winter term**!
Grading procedure: W90 100%

Bemerkungen:

Module of the student's choice and approval by the representative of the study course or the students' dean. The chair offering the module and the courses has to appoint a responsible person, who will be one of the two examiners and ascertain the handling of the module of approximately 15 semester hours. Please note: 2/3 of the courses of the elective module must be topically related to the study program, **5 ECTS** from soft skills or key qualifications will be accepted! Another **Mandatory elective module from M.Sc. Molecular Science (MSM-ME1 - MSM-ME6)** or **Mandatory elective module (CME1 - CME5) or Elective module (CE1 - CE10) from M.Sc. Chemistry** may be chosen, too - however, there **must** be no overlap with other courses from selected Mandatory module or Mandatory elective module!
Module compatibility: M.Sc. Chemie / M.Sc. Molecular Science (Elective module)