Modulbezeichnung:	**Heterogenous Catalysis and Kinetics (IntCat-3)** (Heterogenous Catalysis and Kinetics)	**5 ECTS**
Modulverantwortliche/r:	Jörg Libuda	
Lehrende:	Jörg Libuda	

Startsemester: SS 2021	Dauer: 1 Semester	Turnus: jährlich (SS)
Präsenzzeit: 45 Std.	Eigenstudium: 105 Std.	Sprache: Englisch

Lehrveranstaltungen:

Heterogeneous Catalysis and Kinetics (SS 2021, Seminar, 1 SWS, Jörg Libuda)
Heterogeneous Catalysis and Kinetics (SS 2021, Vorlesung, 2 SWS, Jörg Libuda)

Inhalt:

Syllabus:

- Concepts in heterogeneous catalysis: definition of terms, industrial processes
- Characterization methods for real catalysts (in-situ and operando methods, TEM, SEM, XRD, EXAFS, XANES, XPS, SIMS, DRIFTS, Raman, TPR, etc.)
- Surface Reaction Dynamics: dynamics of adsorption, reaction, desorption, molecular beam experiments, laser spectroscopies
- Elementary Kinetics: microkinetics, transition-state theory, relaxation kinetics, rate-determining step; microkinetic experiments, TAP, SSITKA, etc.
- Model Catalysis: growth processes, preparation and characterization of model catalysts; kinetics on nanostructured surfaces
- Energy-related model catalysis (incl. examples from current research)

Lernziele und Kompetenzen:

Students ...

- acquire the professional competence in heterogeneous catalysis and respective topics
- obtain advanced knowledge in different experimental or theoretical models, their application to current problems, the corresponding data evaluation and interpretation using current research examples
- get familiar with various modern experimental techniques and are able to apply them in a targeted manner

Literatur:

O. Brummel, J. Libuda: "Electrifying Oxide Model Catalysis: Complex Electrodes based on Atomically-Defined Oxide Films", Catalysis Letters, 150 (2020) 1546-1560.

Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

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

[1] **Chemistry (Master of Science)**
(Po-Vers. 2020w | NatFak | Chemistry (Master of Science) | Ergänzende Wahlpflichtmodule | Advances in Interface Research and Catalysis | Heterogenous Catalysis and Kinetics)

[2] **Chemistry (Master of Science)**
(Po-Vers. 2020w | NatFak | Chemistry (Master of Science) | Wahlmodule | Heterogenous Catalysis and Kinetics)

[3] **Molecular Science (Master of Science): ab 1. Semester**
(Po-Vers. 2020w | NatFak | Molecular Science (Master of Science) | Compulsory elective module | Advances in Interfaces and Catalysis | Heterogenous Catalysis and Kinetics)

[4] **Molecular Science (Master of Science): ab 1. Semester**
(Po-Vers. 2020w | NatFak | Molecular Science (Master of Science) | Elective modules | Heterogenous Catalysis and Kinetics)

Studien-/Prüfungsleistungen:

Heterogenous Catalysis and Kinetics (Prüfungsnummer: 65331)
Prüfungsleistung, mündliche Prüfung, Dauer (in Minuten): 20
Anteil an der Berechnung der Modulnote: 100%
weitere Erläuterungen:
O20(PL): Oral examination (20 minutes) or alternative examination according to the FAU Corona Statutes!
Prüfungssprache: Englisch

Erstablegung: SS 2021, 1. Wdh.: WS 2021/2022
1. Prüfer: Jörg Libuda

Organisatorisches:

- **Heterogenous Catalysis and Kinetics** will be taught online (synchronous) till further notice!
- please note: students have to register for the module examination on MeinCampus (check registration periods)!
- Information/registration available on StudOn!

Bemerkungen:

Module compatibility:

- Lecture module within the **Compulsory Elective Module "Advances in Interface Science & Catalysis"** in M. Sc. Chemistry or M. Sc. Molecular Science
- as part of the **Elective Module** in M.Sc. Chemistry/MSc. Molecular Science