

**Modulbezeichnung:** **Advanced Spectroscopic Techniques (ProSpec)** **5 ECTS**  
(Advanced Spectroscopic Techniques)

Modulverantwortliche/r: Henry Dube

Lehrende: Alexander Scherer, Henry Dube

Startsemester: WS 2021/2022

Dauer: 1 Semester

Turnus: jährlich (WS)

Präsenzzeit: 45 Std.

Eigenstudium: 105 Std.

Sprache: Englisch

#### Lehrveranstaltungen:

Advanced Spectroscopy in Organic Chemistry (WS 2021/2022, Vorlesung mit Übung, 3 SWS, Henry Dube et al.)

#### Empfohlene Voraussetzungen:

Basic knowledge of spectroscopy is recommended.

#### Inhalt:

Fundamentals of spectroscopy in organic chemistry will be reviewed. More in-depth methods of molecular spectroscopy in organic chemistry are covered. Advanced methods of NMR-spectroscopy are also covered, such as NMR-spectroscopy of various nuclei (e.g.,  $^1\text{H}$ ,  $^{13}\text{C}$ ,  $^{19}\text{F}$ ,  $^{31}\text{P}$ ). Two-dimensional methods of NMR-spectroscopy using scalar spin-spin couplings (e.g., HSQC, HMBC) are discussed. Furthermore, NMR-spectroscopic methods relying on interactions between coupling nuclear dipoles, which are transmitted directly through space are covered (e.g., NOESY). In addition, other optical spectroscopic methods will be reviewed and discussed in more depth (e.g., UV/Vis-, CD-, IR-spectroscopy and Mass spectrometry).

#### Lernziele und Kompetenzen:

The students ...

- master the reliable use and gain an understanding of spectroscopic methods in organic chemistry, which are used to elucidate organic molecules;
- are able to characterize unknown molecules and to determine their structure as well as their dynamics and interactions (the correlations between the spectroscopic results and the characteristics of the molecules should become understandable and comprehensible);
- discuss practical examples of spectroscopic results and the related correlations in the exercises and practice the structure elucidation on examples.

#### Literatur:

- "Basic one- and two-dimensional NMR spectroscopy", edited by H. Friebolin, Wiley-VCH
- "NMR - From spectra to structures" edited by T. N. Mitchell, B. Costisella, Springer
- "Spectroscopic methods in organic chemistry", Edited by D. H. Williams, I. Fleming, McGraw Hill
- "Modern NMR spectroscopy", Edited by J. K. M. Sanders, E. C. Constable, B. K. Hunter, C. M. Pearce, Oxford

#### Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

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

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

(Po-Vers. 2020w | NatFak | Molecular Science (Master of Science) | Elective modules | Advanced Spectroscopic Techniques)

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

#### Studien-/Prüfungsleistungen:

Advanced Spectroscopic Techniques (Prüfungsnummer: 65631)

Studienleistung, Übungsleistung

weitere Erläuterungen:

SL: practical exercise (homework assignment, 15- 20 pages), non-graded

Prüfungssprache: Englisch

Erstablingung: WS 2021/2022, 1. Wdh.: keine Angabe  
1. Prüfer: Alexander Scherer

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**Organisatorisches:**

- Students have to register for this module (check registration periods)!
- Registration/further information via StudOn: [https://www.studon.fau.de/crs3726967\\_join.html](https://www.studon.fau.de/crs3726967_join.html)

**Bemerkungen:**

Module compatibility:

- Elective Module within the degree programmes MSc Chemistry and Molecular Science, 5 ECTS/not graded