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

Modulverantwortliche/r: Henry Dube  
 Lehrende: Henry Dube, Alexander Scherer

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

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**Lehrveranstaltungen:**

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

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**Empfohlene Voraussetzungen:**

Basic knowledge of spectroscopy is recommended.

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**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., <sup>1</sup>H, <sup>13</sup>C, <sup>19</sup>F, <sup>31</sup>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

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**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) | Wahlmodule | Advanced Spectroscopic Techniques)

[2] **Molecular Science (Master of Science)**

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

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**Studien-/Prüfungsleistungen:**

Advanced Spectroscopic Techniques (Prüfungsnummer: 65631)

Studienleistung, Übungsleistung

weitere Erläuterungen:

Assessment: Practical exercise and participation in the exercises, ungraded

Prüfungssprache: Englisch

Erstablingung: SS 2021, 1. Wdh.: keine Angabe  
1. Prüfer: Alexander Scherer

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**Organisatorisches:**

- Please note: Online course during SS 2021
- Students have to register for this module (check registration periods)!
- Registration/further information via StudOn!

**Bemerkungen:**

Module compatibility:

- as Elective Module in MSc Chemistry and Molecular Science, 5 ECTS/not graded