Course: Spectroscopic Techniques — credits: 5

Course code	CHVH24SPECTECH
Name	Spectroscopic Techniques
Study year	2025-2026
ECTS credits	5
Language	Dutch, with parts in English
Coordinator	S.G. Roelfsema

Modes of delivery	Lecture Practical / Training Tutorial
Assessments	Spectroscopische Technieken Practicum - Other assessment Spectroscopische Technieken Theorie - Written, organised by STAD examinations

Learning outcomes

You know the basic principles and application of the spectroscopic techniques Infrared Spectroscopy (IR), Nuclear Magnetic Resonance (NMR) and Mass Spectrometry (MS).

You recognize and describe the construction of the apparatus associated with the spectroscopic techniques IR, NMR and MS.

You interpret IR and 1H NMR spectra of simple organic compounds using tables of IR frequencies, NMR chemical shift values and 1H coupling patterns.

You independently perform a GC-MS experiment, preprocessing the sample and identifying the substances present, quantifying with calibration measurements, and after data processing and statistical analysis, reporting the results of your experiment according to applicable guidelines.

You will apply the knowledge gained on spectroscopic techniques by independently performing IR and NMR measurements and interpreting the measured spectra, in order to determine the structure and purity of supplied and/or self-synthesized compounds, and report the results according to the applicable guidelines.

Content

In this module, we cover three spectroscopic techniques that are essential for identifying and analyzing organic compounds. These techniques are mass spectrometry (MS), infrared spectroscopy (IR) and nuclear magnetic resonance (NMR) spectroscopy.

You will learn the basics of the equipment used in these analyses, and how to determine the structure of an organic compound from a spectrum. You will do these structure analyses using MS, IR and NMR spectra from the literature, sometimes combining the information from different spectra to arrive at your answer.

The module also contains a practical part, where you will work with the equipment yourself. You will gain more insight into the possibilities offered by MS, in combination with GC, to identify and quantitatively measure substances. You will also perform a synthesis in which you will use NMR and IR to determine for yourself exactly what substance you have made, and what its purity is.

Included in programme(s)

Chemistry

School(s)

Institute for Life Science & Technology

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