

**Modules:**

physics700 **Elective Advanced Lectures**  
 physics710 **Experimental Physics**  
 physics720 **Applied Physics**

**Course:****Modern Spectroscopy (E/A)****Course No.:** physics741

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	2+1	4	WT/ST

**Requirements:****Preparation:**

Fundamentals of Optics, Fundamentals of Quantum Mechanics

**Form of Testing and Examination:**

Requirements for the examination (oral or written): successful work with the exercises

**Length of Course:**

1 semester

**Aims of the Course:**

The aim of the course is to introduce the students to both fundamental and advanced concepts of spectroscopy and enable them to practically apply their knowledge.

**Contents of the Course:**

Spectroscopy phenomena - time and frequency domain;  
 high resolution spectroscopy;  
 pulsed spectroscopy; frequency combs;  
 coherent spectroscopy;  
 nonlinear spectroscopy: Saturation, Raman spectroscopy, Ramsey spectroscopy.  
 Applications of spectroscopic methods (e.g. Single molecule spectroscopy; spectroscopy at interfaces & surfaces, spectroscopy of cold atoms; atomic clocks; atom interferometry)

**Recommended Literature:**

W. Demtröder; Laser spectroscopy (Springer 2002)  
 S. Svanberg; Atomic and molecular spectroscopy basic aspects and practical applications (Springer 2001)  
 A. Corney; Atomic and laser spectroscopy (Clarendon Press 1988)  
 N. B. Colthup, L. H. Daly, S. E. Wiberley; Introduction to infrared and Raman spectroscopy (Academic Press 1990)  
 P. Hannafor; Femtosecond laser spectroscopy (Springer New York 2005)  
 C. Rulliere; Femtosecond laser pulses: principles and experiments (Springer Berlin 1998)