

Modules:

physics70a **Elective Advanced Lectures: Experimental Physics**

physics70b **Elective Advanced Lectures: 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 for Participation:**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. Hannaford; Femtosecond laser spectroscopy (Springer New York 2005)
 C. Rulliere; Femtosecond laser pulses: principles and experiments (Springer Berlin 1998)