Modern Spectroscopy (E/A) - physics741

Degree - M.Sc. in Physics (PO von 2014)

Module	**Elective Advanced Lectures: Experimental Physics**
Module No.	physics70a

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)