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

Modules:
- physics70a Elective Advanced Lectures: Experimental Physics
- physics70b Elective Advanced Lectures: Applied Physics

Course: Modern Spectroscopy (E/A)

Course No.: physics741

<table>
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<tr>
<th>Category</th>
<th>Type</th>
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<th>Teaching hours</th>
<th>CP</th>
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<td>Elective</td>
<td>Lecture with exercises</td>
<td>English</td>
<td>2+1</td>
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<td>WT/ST</td>
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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)

September 2011