Course: **Modern Spectroscopy (E/A)**

Course No.: physics741

<table>
<thead>
<tr>
<th>Category</th>
<th>Type</th>
<th>Language</th>
<th>Teaching hours</th>
<th>CP</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective</td>
<td>Lecture with exercises</td>
<td>English</td>
<td>2+1</td>
<td>4</td>
<td>WT/ST</td>
</tr>
</tbody>
</table>

**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