

# 10610-747(8) Molecular Physics (1½l, 1½p)

2014

## Course summary:

Quantum mechanics of rotational and vibrational degrees of freedom of molecules. Electronic spectra of molecules. The use of symmetries in molecular physics. The interaction of light with molecules. Kinetics and dynamics of elementary molecular reactions.

## Outcomes of course:

The course skills the student in the basis of the quantum mechanical treatment of molecules with specific emphasis on interaction with light. It also lays the foundation for courses on laser spectroscopy.

## Lecturer:

Prof H Schwoerer  
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Office: Room number 1003 in the Merensky Physics Building.

## Course content:

### **Formal lectures**

The following topics are covered during formal lectures: Quantum mechanics of electronic, vibrational and rotational states of diatomic molecules, spectra of molecules, interaction of light with molecules.

### **Practical (Homework):**

The allocated homework is designed to consolidate and widen the subjects presented in the lectures. Oral presentations are designed to practice independent study of scientific topics (related to the lectures).

### **Study material:**

Prescribed textbook: "**Molecular physics and elements of quantum chemistry**" (Springer) Haken and Wolf.

### **Learning opportunities:**

Lectures

### **Assessment:**

#### **Methods of Assessments**

Homework problems  
Oral presentations

#### **Venue and time of assessment opportunities**

As determined by lecturer in consultation with students at beginning of semester.

#### **Availability of marks:**

Tutorial problems: marks available within 2 weeks.  
Examination: marks available within 2 weeks of the examination.

#### **Calculation of final mark for the module:**

Oral presentation 50 % home work 50 %