

CH-444

**Electronic spectroscopy**

Ingle Rebecca Ann

Cursus	Sem.	Type
Chemistry	BA5	Obl.
Chimiste	MA1, MA3	Opt.
Photonics		Obl.

Language of teaching	English
Credits	3
Session	Winter
Semester	
Exam	During the semester
Workload	90h
Weeks	14
<b>Hours</b>	<b>3 weekly</b>
Courses	2 weekly
Exercises	1 weekly
<b>Number of positions</b>	

**Summary**

This course focuses on the electronic structure of atoms, diatomic and polyatomic molecules in order to understand their ultraviolet-visible absorption and photoelectron spectra.

**Content**

- Review of quantum mechanics and light-matter interaction
- Group theory for spectroscopy
- Atomic spectroscopy
- Vibrational spectroscopy
- Electronic spectroscopy of diatomic and polyatomic molecules
- Photoelectron spectroscopy

**Keywords**

Atomic and molecular spectroscopy, light matter interaction, electronic structure, photoelectron spectroscopy, UV-VIS spectra, vibrational spectra

**Learning Prerequisites****Recommended courses**

Spectroscopy, Physical Chemistry

**Learning Outcomes**

By the end of the course, the student must be able to:

- Apply quantum mechanical model systems to handle the interaction of atoms and molecules with electromagnetic radiation
- Explain the general features of absorption and photoelectron spectra and their dependence on the sample properties
- Identify the point group of a molecule
- Construct representations of point groups and decompose them into irreducible representation
- Identify the symmetry of vibrational and electronic states using character tables
- Construct electronic configurations and term symbols for atoms and molecules
- Derive explain and apply spectroscopic transition rules for electronic transitions in atoms and molecules

- Explain and identify radiative and non-radiative relaxation processes of excited molecular states

### **Transversal skills**

- Assess progress against the plan, and adapt the plan as appropriate.
- Set objectives and design an action plan to reach those objectives.
- Use a work methodology appropriate to the task.
- Access and evaluate appropriate sources of information.

### **Assessment methods**

70% oral exam, 30% homework assignments

### **Resources**

#### **Bibliography**

Modern Spectroscopy / Hollas

#### **Ressources en bibliothèque**

- [Modern spectroscopy / Hollas](#)