
COURSE: Fundamental of molecular spectroscopy

ACADEMIC YEAR: III

TYPE OF EDUCATIONAL ACTIVITY: Basic

TEACHER: Angela De Bonis

e-mail: angela.debonis@unibas.it**website:****phone:** 0971206249**mobile (optional):****Language:** italian

ECTS: 6 (3 lessons + 3 practice)**n. of hours:** 60 (24 lessons + 36practice)**Campus:**Potenza
Departmento of Science
Program:**Semester:** I

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The student will acquire basic knowledge of the interaction of radiation with matter and will be able to use the quantum mechanics and group theory principles to understand molecular spectra. The student will recognize the relationship between molecular spectra and molecular properties.

Educational goals:

- Molecula symmetry
- Radiation-matter intaraction
- Rotational spectroscopy
- Vibrational spectroscopy
- Raman spectroscopy
- Atomic spectroscopy electronic specroscopy
- Fluorescence and phosphorescence
- LASER

Expected learning

- To recognize the symmetry of molecole
- To identify the active molecular motion
- To undestand rotational, vibrationa, Raman and electronic spectra.

PRE-REQUIREMENTSMath 1, Math 2, Physics, Physical Chemistry II

SYLLABUS

Molecular symmetry and symmetry point group. The interaction of radiation with matter: absorption, spontaneous emission, stimulated emission.

Rotational energy level and rotational spectra. Vibrational energy level and vibrational spectra.

Polyatomic molecules: normal modes of vibration. Raman spectroscopy. Electronic energy level and rotovibronic fine structure of an electronic spectrum. Radiation and radiationless decay of electronic states. Basics of Laser.

TEACHING METHODSTheoretical lessons, Laboratory tutorials.

EVALUATION METHODSOral examination

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

C.N. BANWELL, E. McCASH – Fundamental of Molecular Spectroscopy, McGraw Hill (1994)

J.M. HOLLAS, Modern Spectroscopy – Wiley (1987)

D.C. HARRIS, M.D. BERTOLUCCI – Symmetry and Spectroscopy – Dover (1989)

INTERACTION WITH STUDENTS

The teacher is open for discussion and additional teaching during the planned weekly colloquia (Tuesday and Thursday 10-12), by email (angela.debonis@unibas.it) or by phone (0971 206249)

EXAMINATION SESSIONS (FORECAST)¹

15/02/2017

15/03/2017

12/04/2017

16/05/2017

13/06/2017

18/07/2017

19/09/2017

17/10/2017

19/12/2017

SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION

¹Subject to possible changes: check the web site of the Teacher or the Department/School for updates.