
COURSE: Fundamental of molecular spectroscopy

ACADEMIC YEAR: 2017-2018

TYPE OF EDUCATIONAL ACTIVITY: Basic

TEACHER: Angela De Bonis

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website:

phone: 0971206249

mobile (optional): 3472330740

Language: Italian

ECTS: 6 (3 lessons + 3
practice)n. of hours: 60 (24 lessons +
36practice)Campus: **Potenza**
Dept./School: **Dipartimento di
Scienze**Semester: I
from 02/10/2017 to
15-31/01/2018

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:

- Molecular symmetry
- Radiation-matter interaction
- Rotational spectroscopy
- Vibrational spectroscopy
- Raman spectroscopy
- Atomic spectroscopy electronic spectroscopy
- Fluorescence and phosphorescence
- LASER

Expected learning

- To recognize the symmetry of molecule
- To identify the active molecular motion
- To understand rotational, vibrational, Raman and electronic spectra.

PRE-REQUIREMENTSMath 1, Math 2, Physics I, Physics II, 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 rovibronic fine structure of an electronic spectrum. Radiation and radiationless decay of electronic states. Basics of Laser.

TEACHING METHODSTheoretical lessons, Laboratory tutorials.

EVALUATION METHODSLaboratory reports. Oral 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

14/02/2018

13/03/2018

16/05/2018

13/06/2018

18/07/2018

12/09/2018

10/10/2018

19/12/2018

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.