

<b>DIPARTIMENTO DI SCIENZE</b>			
COURSE: Fundamental of molecular spectroscopy			
ACADEMIC YEAR: 2018/2019			
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 Department 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:

- 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 molecules
- To identify the active molecular motion
- To understand rotational, vibrational, Raman and electronic spectra.

#### PRE-REQUIREMENTS

Math 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 rovibronic fine structure of an electronic spectrum. Radiation and radiationless decay of electronic states. Basics of Laser.

#### TEACHING METHODS

Theoretical lessons, Laboratory tutorials.

#### EVALUATION METHODS

Oral examination

## LOGO DELLA STRUTTURA PRIMARIA

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### 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)

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### 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](mailto:angela.debonis@unibas.it)) or by phone (0971 206249)

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### EXAMINATION SESSIONS (FORECAST)<sup>1</sup>

12/02/2019

12/03/2019

16/04/2019

14/04/2019

11/05/2019

16/07/2019

24/09/2019

15/10/2019

12/11/2019

17/12/2019

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SEMINARS BY EXTERNAL EXPERTS    YES     NO

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### FURTHER INFORMATION

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