DIPARTIMENTO DI SCIENZE

COURSE: **Fundamental of molecular spectroscopy**			
ACADEMIC YEAR: **2019/2020**			
TYPE OF EDUCATIONAL ACTIVITY: Basic			
TEACHER: Angela De Bonis			
e-mail: angela.debonis@unibas.it		website:	
phone: 0971206249		mobile (optional): 3472330740	
Language: italian			
ECTS: 6 (3 lessons + 3 practice)	n. of hours: 60 (24 lessons + 36practice)	Campus:Potenza Department of Science	Semester: I Dal 01 ottobre 2019 al 20 dicembre/20 gennaio 2020

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 intaraction
- 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 rotovibronic fine structure of an electronic spectrum. Radiation and radiationless decay of electronic states. Basics of Laser.

TEACHING METHODS

Theoretical lessons, Laboratory tutorials.

EVALUATION METHODS

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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]

11/02/2020
10/03/2020
21/04/2020
19/05/2020
09/06/2020
15/07/2020
12/09/2020
20/10/2020
17/11/2020
15/12/2020

SEMINARS BY EXTERNAL EXPERTS YES □ NO X

FURTHER INFORMATION

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