
COURSE: Advanced Physical Chemistry Mod. 2

ACADEMIC YEAR: 2019-2020

TYPE OF EDUCATIONAL ACTIVITY: Basic

TEACHER: Prof. Roberto Teghil

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Language: **ITALIAN**

ECTS: (lessons e
tutorials/practice) **5**n. of hours: (lessons e
tutorials/practice) **40**Campus: **Potenza**
Dept./School: **Dipartimento di
Scienze**
Program: **Chemical Sciences
(LM54)**Semester: **II**
(02/03/2020,
30/06/2020)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main goal of the course is to allow a detailed knowledge of the optical properties of solids and of statistical thermodynamics. The learning outcomes will be:

- *knowledge of the optical and electronic characteristics of crystalline solids;*
 - *knowledge of the statistical thermodynamics and of its chemical applications.*
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PRE-REQUIREMENTS

Background from Bachelor Degree in Chemistry (L27)

SYLLABUS

Block 1: Optical properties of solids (18 hours)

Dielectric and optical properties. Non linear optics. Absorption of radiation in solids. Defects.

Block 2: Statistical thermodynamics (22 hours)

Work, heat, and energy. The laws of thermodynamics. The Helmholtz and Gibbs energies.

Fundamentals of statistical thermodynamics. Maxwell-Boltzmann distribution. Molecular and canonical partition functions. Thermodynamic functions calculated by statistical thermodynamics. Bose-Einstein and Femi-Dirac distributions. Applications.

TEACHING METHODS

Theoretical lessons.

EVALUATION METHODS

Oral examination.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- *P.A. COX – THE ELECTRONIC STRUCTURE AND CHEMISTRY OF SOLIDS, OXFORD 2003.*
 - *P.W. ATKINS, J. DE PAULA – CHIMICA FISICA, ZANICHELLI 2012.*
 - *P.W. ATKINS, J. DE PAULA, PHYSICAL CHEMISTRY, OXFORD UNIVERSITY PRESS 2014.*
 - *MACZEC – STATISTICAL THERMODYNAMICS, OXFORD 1998.*
 - *B.J. MCCLELLAND – STATISTICAL THERMODYNAMICS, JOHN WILEY & SONS 1974.*
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INTERACTION WITH STUDENTS

Office Hours: 14-15 from Monday to Wednesday at the Laser Chemical Physics Laboratory. The teacher can be also contacted by e:mail.

EXAMINATION SESSIONS (FORECAST)¹

18/02/2020, 24/03/2020, 21/04/2020, 19/05/2020, 23/06/2020, 14/07/2020, 22/09/2020, 20/10/2020, 17/11/2020, 15/12/2020.

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.

20/11/17